# Entangling Molecules: an ethnography of a carbon offset project in Madagascar's eastern rainforest

**Sara Peña Valderrama**

In this dissertation I explore the multiple social lives of 'carbon' as key object of contemporary forms of global environmental governance. Through an ethnography of a forest carbon project, I detail the many forms that 'carbon' takes as it is deployed in a small locality in the forests of Madagascar.

TAMS was a forest carbon project that ran for two decades in eastern Madagascar. Its aim was to reforest degraded fallows from slash-and-burn agriculture, or *tavy*, and to provide farmers with alternative livelihoods through the benefits obtained from the sale of carbon credits. Carried out by major conservation organisations, international institutions and the Malagasy government, TAMS was once hailed as a pilot carbon project for the whole of Africa. Six years after reforestation began, however, it came to a halt due to a series of complications and it was abandoned.

My ethnography focuses on a series of glimpses into 'carbon' in its many guises as part of TAMS. This leads me to an analysis of the ways in which carbon credits are produced by, and at the same time re-articulate, ideas of value and waste in relation to forests and *tavy*; the peculiar materiality of 'carbon' as natural resource and form of labour; the experiences of 'carbon' as an instance of state oppression for farmers; and the complexity that arises from project actors' efforts to turn grounded trees into mobile carbon credits. All along, we see how, far from the bounded CO2 molecule, the 'carbon' of forest carbon projects is not a fixed or stable object, but rather appears and disappears in multiple ways through diverse material and discursive practices. My aim is to show how specific forms of 'carbon'—in their articulation of people's relationships to each other and to their environments—open or foreclose particular socio-natural futures.

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# List of Abbreviations

AGA: Association des Guides d'Andasibe, pg. 67

AMNP:Andasibe-MantadiaNational Park, pg. 2

ANAE: Association Nationale d'Actions Environnementales, pg. 15

ANGAP: Association Nationale pour la Gestion des Aires Protégées, pg. 31

BioCF: BioCarbon Fund, pg. 15

CAZ: Corridor Ankeniheny-Zahamena, pg. 58

CDM: Clean Development Mechanism, pg. 7

CELB: Centre for Environmental Leadership in Business, pg. 47

CFAM:Corridor Forestier Analamay-Mantadia, pg. 62

CI: Conservation International, pg. 15

CIREF: Circonscription de l'Environnement et Forêts, pg. 33

COP: Conference of the Parties, pg. 48

DCC: Direction Changement Climatique, pg. 257

DGE: Direction Générale de l'Environnement, pg. 257

DGF: Direction Générale des Forêts, pg. 257

DNA: Designated National Authority, pg. 256

EP1:Environmental Programme 1, pg. 55

EP2: Environmental Programme 2, pg. 56

EP3:Environmental Programme 3, pg. 57

EPA: Environmental Protection Agency, pg. 44

ERI:Eco-regional Initiative, pg. 101

ERPA: Emission Reductions Purchasing Agreement, pg. 15

EUA: European Emission Allowances, pg. 227

EU-ETS: European Union Emissions Trading System, pg. 46

FA: Facilitating Agents, pg. 15

FCPF: Forest Carbon Partnership facility, pg. 48

GELOSE: Gestion Locale Sécurisé, pg. 56

GoM: Government of Madagascar, pg. 15

ICDP: Integrated Conservation and Development Programme, pg. 56

IET: International Emissions Trading, pg. 7

IMF: International Monetary Fund, pg. 11

IPCC: Intergovernmental Panel on Climate Change, pg. 4

IUCN: International Union on Nature Conservation, pg. 52

JI: Joint Implementation, pg. 7

LULUCF: Land Use, Land-Use Change and Forestry, pg. 47

MATE: Mand and the Environment, pg. 65

MEF: Ministry of Environment and Forests, pg. 67

MNP: Madgascar National Parks, pg. 31

NEAP: National Environmental Action plan, pg. 54

NGO: Non-governmental Organisation, pg. 11

ONE: Office National de l'Environnement, pg. 55

PDD: Project Design Document, pg. 38

PES: Payment for Ecosystem Services, pg. 57

PLOF: Plan Local d'Occupation Foncière, pg. 250

PNF: Programme National Foncier, pg. 249

REDD: Reduced Emissions from Deforestation and Degradation, pg. 8

SAF-FJKM: Sampan'Asa momban'ny Fampandrosoana FJKM, pg. 32

SAP: Stractural Adjustment Plan, pg. 52

SLAs: Sustainable Livelihood Activities, pg. 99

TAMS: Tetik'asa Mampody Savoka, pg. 2

UCFBC: Unité de Coordination des Fonds Biocarbon, pg. 67

UNCED: United Nations Conference on Environment and Development, pg. 45

UNFCCC: United Nations Framework Convention on Climate Change, pg. 38

USAID: United States Agency for International Development, pg. 53

VITA: Volunteers in Technical Assistance, pg. 65

WB: World Bank, pg. 15

WCS: Wildlife Conservation Society, pg. 55

WWF: World Wildlife Fund, pg. 52

# Declaration

The work and contents of this thesis have not been submitted elsewhere for any other degrees or qualifications

# Statement of Copyright

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*To my mum, for being there from the beginning;*

*To Catherine, for being there over this five-year long journey;*

*And to the women of Mahatsara, whose strength, courage and kindness will be with me forever.*

# Chapter One: Introduction

## Introduction

> *Then, directly in front of him, he saw an animal that looked at first like a small deer. The animal came to his outstretched hand, and he saw that it had no horns. Its snout was long, and he glimpsed sharp teeth shaped like little scimitars. The long thin legs ended in cablelike fingers. The ears were large, flaring forward, the eyes limpid amber, in which the pupil floated like a glittering jewel, changing color with shifts of the light: obsidian, emerald, ruby, opal, amethyst, diamond. Slowly the animal raised one paw and touched his face, stirring memories of the ancient betrayal. Tears streaming down his face, he stroked the animal's head. He knew he must get back to the settlement before dark. There is always something a man must do in time. For the deer ghost there was no time.*
>
> William S. Burroughs*, Ghost of Chance, (1995:5)*

In his novel Burroughs tells the story of Captain Mission, the founder of 'the free pirate settlement Libertatia on the west coast of Madagascar' (1995:20), where he struggles to protect lemurs (known as ghosts in the native language) and 'to demonstrate for all to see that three hundred souls can coexist in relative harmony with each other, with their neighbors, and with the ecosphere of flora and fauna' (1995:8). In a stone temple he discovers deep in the forest—the entrance to the biological Garden of Lost Chances—lives Mission's lemur friend Ghost, along with various other bizarre creatures. But when Martin, an emissary of the Board, blows up the

structure to sabotage Mission's project, catastrophe ensues. Ghost dies in Mission's arms, taking with it 'a chance that occurs only once in a hundred and sixty million years' (Burroughs 1995:21) and the place turns into the Museum of Lost Species, releasing, through Mission's curse, extinct and strange diseases that wreak havoc worldwide. At the end of the story Burroughs leaps out of the narrative and asks readers to support the Duke University Primate Centre in order to save Madagascar's lemurs, endangered, he argues, by hunting, population growth and deforestation and slash-and-burn cultivation.

Around the same time as *Ghost of Chance* was published, in the early 1990s, Louise Holloway, a British environmental researcher, travelled to Madagascar. The Andasibe Mantadia National Park (AMNP from now on) in the eastern Malagasy forests had recently opened, a sign of the times in the island, which had seen an escalation of conservation activity since the early 1980s as the country had opened up to Western powers after a decade of isolationist policies under a socialist, post-colonial government. Similarly concerned for the lemurs of the area of Andasibe, whose future seemed endangered by slash-and-burn agriculture, or *tavy*, Holloway began to formulate an idea for a project that would enable both lemurs and *tavy* farmers to thrive in the rainforest. For both Holloway and Burroughs, then, lemurs indexed future possibilities of social and ecological harmony. Thus began TAMS, *Tetik'asa mampody savoka*, or 'the project to restore the fallows'. By 2008, TAMS would have transformed into one of Africa's first pilot forest carbon projects, a reforestation initiative aimed at generating carbon credits to mitigate climate change and providing sustainable development to *tavy* farmers. By 2013 it had also become entangled with a series of complications that involved, among others, partly incommensurate agendas, a complex organisational structure or difficulties in establishing whom 'carbon' belonged to. About twenty years after it began, TAMS was abandoned. It could be said that TAMS today lies somewhere close to Ghost, buried in the rubble of the Museum of Lost Species (and Projects).

In this dissertation I bring TAMS back to life one last time, as I explore the multiple social lives of carbon as key object in contemporary forms of global environmental governance. Through an ethnography of TAMS as a forest carbon project, I detail how different practices and social imaginaries give rise to varied forms and understandings of 'carbon'. My aim, like Mission's settlement of Libertatia, is to explore the ways in which different articulations of people's relationships to each other and their environments open or foreclose particular present and future possibilities. Carbon, from this perspective, appears as an object of contestation through which diverse socio-natural futures are imagined and play out.

*

The first disease in Burroughs' story—the 'Christ sickness'—unfolds on a clear day in Madagascar, where a group of herdsmen burn the forest to feed their cattle. Although there are no cattle in Mahatsara, a little village in the eastern Malagasy rainforest situated right by the AMNP, people there too practise *tavy* to cultivate rice. Their agricultural practice is in fact part and parcel of what distinguishes them as *Betsimisaraka*, one of the eighteen ethnic groups who inhabit the island[1]. Towards the end of September, men venture out to the fields and burn the vegetation that has rebelliously taken over last year's agricultural efforts. Fires can be constantly spotted from Mahatsara's highest points, becoming the centre of conversation, since, were they to reach the hilltops, they would draw the unwelcome presence of the authorities, with feared consequences. The smoke will travel unbound across the region and might make it to the capital, Antananarivo, where, confounded with heavy pollution, it will also enter urbanites' conversations: 'they are doing *tavy* in the East, that's why it's so hot and the air so polluted'; 'they are doing *tavy* and destroying the nation's most precious resource: our

1 *Tavy* is the official designation of slash-and-burn or shifting agriculture in the island, although it has many regional variants (i.e. *hatsake* or *jinja*). I use the term *tavy* because it is the one employed in Mahatsara.

forests'. In different forms, the smoke will also travel to foreign locations, such as offices in the World Bank or the Intergovernmental Panel on Climate Change (IPCC), where global warming is 'scientifically assessed' (Calel 2011:15) and debated in yearly meetings. Since this scientific body claimed in 2007 that about 20% of global anthropogenic CO2 emissions came from deforestation and forest degradation (Van der Werf et al. 2009)[2], in fact, the smoke released from the fields in Mahatsara has become a 'critical object of intervention' (Lansing 2011:739) in the management of climate change. Emanating from a world biodiversity 'hotspot', in turn, this smoke has also entered debates over environmental conservation and sustainable development, and since around the year 2000, it became the central yet elusive object of the ambitious forest carbon project TAMS. Through this initiative, 3000 hectares of degraded fallows from *tavy* were to be reforested in order to create a 'carbon sink'.

When the fires die down, and with the land still warm, women (and some men) in Mahatsara make it to the newly cleared fields early in the morning, cooking utensils and rice skilfully balanced on their heads, babies tightly wrapped around their backs. Their feet are dexterous at holding them in the steep, charred fields, and their hands rhythmically move as they pierce the ground with a dibber, or *fitomboka,* and throw a couple of grains of rice or corn in each hole they make. If all goes well, and with a constant, careful lookout for greedy little birds over the coming months, these seeds will turn into the year's (meagre) harvest. Since families in Mahatsara are not allowed to expand into new land, however, the fertility of their fields is progressively diminishing, with harvests in a constant decline due to over-intensive farming. From 2009, in turn, many of these fields further shrank, some even by half, in order to make space for TAMS' promising tree seedlings: instead of rice, the fields and its owners would now produce

2 This number was later reviewed and brought down to about 12% (Van der Werf et al. 2009:737)

'carbon'—an ambiguous and often undefined object through which people expected to obtain work and revenue.

As the above account exemplifies, the smoke released from *tavy* fields is an unbound and elusive object that travels across different spaces, times and imaginations, in both material and abstract forms. As the multiple object of forest carbon projects, in turn, it brings many of these together in novel forms of global governance that articulate conservation and development initiatives with emergent economic objects and practices. Far from the contained molecule of carbon dioxide, then, the 'carbon' of forest carbon projects such as TAMS is a dispersed and multiple object: it is both an ecological and economic object, rooted to particular socio-material landscapes as part of trees and at the same time circulating in transnational emissions markets as information; it is an element that promises to mitigate climate change while generating capitalist value by itself; as an 'offset', it is a peculiar form of equivalence between different actions, times and places — the outcome of a calculation between what will be and *would have* been; it is a new financing mechanism for transnational conservation initiatives, a source of national revenue for post-colonial states and the promise of a new form of 'development' for marginalised, forest communities. Like the pupil of the mythical animal described by Burroughs in the opening quotation—a 'glittering jewel' that changes colour with 'shifts of the light'— so does 'carbon' appear through multiple refractions as it is deployed in forest carbon projects such as TAMS. It is some of these refractions that I explore in this dissertation as I focus on the multiple social lives of carbon in a specific forest carbon project. Taken together, they provide important and unexplored insights into the kinds of things that 'carbon' is and the kinds of things that 'it' does, as key object in contemporary forms of global environmental governance.

In an effort to bring carbon[3] to the foreground I follow the different shapes it takes as it is deployed in the eastern Malagasy rainforest. My aim, however, is not to simply offer an account of the different meanings and experiences ascribed to carbon by different actors, but, rather, to query and explore carbon itself as the result of different practices and experiences that bring it into being—or don't—in different forms (see Mol 2002a; Lien and Law 2011).

In the following sections, I provide an introductory overview to this dissertation and the research context. I begin by exploring contemporary carbon imaginaries, and its emergence as key socio-technical artifact that merges the objectives of mitigating climate change, providing 'sustainable development' and creating capitalist value. I then move to its arrival in Madagascar, as I focus on the particularity of the island in global environmental imaginaries and the way carbon has rearticulated the relationship between forest conservation and *tavy*. We see here the intersection between carbon as an abstract object and the space/time where it is made concrete, which also leads me to a brief introduction of TAMS, as the key site where the abstract and the concrete meet. From here, I move on to situate carbon theoretically—through a brief review of the literature on the commodification of nature—and detail the specific issues that arise as a result and the ways in which I propose to approach them. I then provide a summary of the chapters and the themes that run throughout them. The rest of the chapter is dedicated to presenting how and where I conducted fieldwork, as I introduce the village of Mahatsara and highlight those elements that are relevant in understanding the methodological and knowledge practices this dissertation is based on.

## Carbon imaginaries today

3 From now on I refer to carbon, instead of 'carbon', bearing in mind that it is a multiple object that takes different shapes.

*The Spirit of the Forest*

> *In consequence of burning coal 'spiritus sylvestris' comes into being. This spiritus, which was formerly unknown and cannot be kept in vessels, and cannot be converted into a visible form, I call by the new name of 'gas'.*
>
> Jan Baptist van Helmont*, Ortus med. 1656,* (Almqvist 2003:93)

*Spiritus sylvestris*, 'wild' or 'forest' spirit, was the first name given to carbon dioxide by chemist Jan Baptist Helmont, as he concluded that the mass lost by charcoal as it turned to ash upon burning must have transformed into an invisible substance. This 'gas', as Helmont called it, would later become known as 'fixed air', a name given to it by Scottish physicist Joseph Black in 1757 in reference to its 'bound' or 'fixed form in carbonates and weak alkalis' (Almqvist 2003:93). A few years later Lavoisier would describe 'fixed air' as a combination of carbon and oxygen, calling it carbonic acid gas. Although we now know that carbon dioxide is anything but 'fixed'—circulating between land, atmosphere and oceans and making life on earth possible (and, since the industrial revolution, endangered)—it may well be argued that its 'forest spirit' has made a comeback in the last two decades, giving the molecule hitherto unknown forms and capacities.

Although the role of carbon dioxide in regulating the earth's climate had been known for over a century, it was in 1997, through the adoption of the Kyoto Protocol (which came into force in 2005) that the molecule was brought into being as a socio-technical artifact with multiple properties. Through the establishment of binding emission reductions among (most) industrialized countries, CO2 was made both institutionally visible at a global level as a biological object and, more fundamentally, made a scarce resource. At the same time, the creation of the so-called 'flexibility mechanisms'—International Emissions Trading (IET), the Clean Development Mechanism (CDM) and Joint Implementation (JI)—gave this

biological object an economic life, as they now allowed for it *also* to be traded as a commodity in international emissions markets. Although this was not a completely novel approach to the issue of environmental degradation, it did mark a sea change for two reasons: first, it created the possibility of organising a global trade in carbon permits, thus linking disparate times and places globally through a new market; second, and more fundamentally, it created a whole new sphere of intervention through the object called the 'carbon offset': under the CDM, projects that reduced CO2 emissions in developing countries could now generate carbon 'credits' for polluters to use in industrialized ones. In exchange, some form of 'sustainable development', along with the revenue from the sale of credits had to flow in the opposite direction. CO2 was no longer just a (scarce) biochemical object of climate change science and governance *and* a commodity, it was now also a form of 'sustainable development' and a source of monetary value for many states in developing countries (see also Leach and Scoones 2015:3). In various forms, the carbon molecule emerged as a new organising principle of global topographies (and as I will argue in the conclusion, chronographies). With the inclusion of forests in these mechanisms as key sites where emissions reductions could be generated (first through reforestation as part of the CDM, and later through conservation in REDD, Reduced Emissions From Deforestation and Degradation), in turn, the CO2 molecule became imbricated with conservation practice and the landscapes and peoples targeted by it. As carbon was abstracted, the political nature of people's relationship to nature qua trees shifted, and its potentiality as a form of value opened up further spaces of governance and appropriation. The social, political and economic lives of carbon thus multiplied through the 'reorganisation of social, natural, and technical processes' (Mitchell 2011:239).

We can begin to see how today, the idea of carbon as 'spirit of the forest' has been revitalised. But where Helmont's spirit referred to something invisible, uncontainable and undomesticated—that is, 'wild'—the

forest spirit of carbon dioxide is today seen as exactly the opposite: visible, calculable and containable in 'carbon sinks'; or, in other words, 'tamed' (Leach and Scoones 2015:4). In turn, it is a particularly 'capitalist' spirit (Weber 1958) in that, as an element integrated into a market, it also holds the potential to acquire monetary value. From this perspective, carbon may be seen today as an element productive of what Waldby has called 'biovalue': 'a yield of vitality produced by the biotechnical reformulation of living processes' (2002:310). Although Waldby is here referring to stem cell technologies and the way they can be engineered in the lab to 'increase or change their productivity along specified lines' (2002:310), the carbon molecule can be seen to acquire this vitality as it is 'put to work' in forest carbon projects: it can mitigate climate change, protect biodiversity, provide sustainable development, and become an economic object with exchange value of its own. Like bioprospecting agreements explored by Hayden, the carbon of forest carbon projects such as TAMS, seems to 'promise the world' (2003:3).

In the next section I explore the arrival of carbon to Malagasy landscapes and its entanglement with forest conservation practice and *tavy*. I complement this with a brief description of TAMS, its main aims and history.

*Forest Spirits*

Madagascar's forests today are not just renowned for harbouring the spirit of the forest in 'carbon sinks', but also for forest spirits. The word lemur—the island's most iconic animal—comes form the Latin *lemures*, which in Roman mythology refers to ghostly or ancestral spirits, a name Linnaeus gave the primates due to their nocturnal habits (Anderson 2009:176). The fact that both Holloway and Captain Mission arrived in Madagascar in the early 1990s with a mission to save lemurs is not a completely chance occurrence. Situated in the Indian Ocean, this large island

has attracted naturalists and scientists since the eighteenth century, who were drawn to it by its peculiar flora and fauna (Anderson 2009).


**Figure 1. Map of Madagascar. Source: Nations Online Project**

It was towards the end of the twentieth century, however, that Madagascar acquired a central position in global environmental imaginaries. This popularity derives from the island's particular biological and geographical features which have imbued it with quasi-mythical properties as a biodiversity 'hotspot', a status it acquired in 1988 (I explore this further in chapter four). As Burroughs himself portrayed it in Ghost of Chance, Madagascar is imagined to be a place that 'has lain moored in enchanted calm' (1995:16) for tens of millions of years, having followed a unique biological path due to its early geological brake from the mainland. It is through this anachronic anomaly—Madagascar as 'biogeographical anachronism', as Sodikoff calls it (2013:140)—that the island's unusually high levels of species endemism (around 80%) tend to be explained. The recent arrival of humans, said to have began around 2000 years ago[4] with Indonesian, and later African, populations, reinforces the view of a perceived accelerated rate of degradation and extinction (Sodikoff 2013). Being an island 'out of time', has therefore squarely situated Madagascar within the environmental imaginaries of 'our (Western) times'.

Madagascar became a world referent for conservation-based aid in the early 1980s, as the country began to open up to Western institutions such as the International Monetary Fund (IMF) after a decade of socialist/isolationist policies enacted by the post-colonial state. As I detail in the next chapter, this was also the time when discourses of environmental crisis were becoming institutionalised as part of global forms of governance through organisms such as the IPCC or the turn to 'green development' by the World Bank (see, for example, Goldman 2001). Thus, at the turn of the century, Madagascar's uncommonly high levels of species endemism translated into an unusually high presence, activity and power of transnational environmental NGOs and donors in the country. The coupling of imaginaries of Madagascar as global environmental hotspot with the

4 Although new archaeological data suggest occupations as early as 2000 AC (R Dewar et al. 2013:1)

ascent of carbon (along with other 'ecosystem services') in the last decade has re-invigorated the role of the island's forests as crucial sites of international concern and action. In this environment, as both Burroughs' and Holloway's stories exemplify, a very particular element stands out: *tavy.*

*Tavy*, also known as slash-and-burn or shifting agriculture, is a rotational farming technique that involves the clearing of fields through cutting and burning for (mainly) rice cultivation in hilly landscapes. The key lies in long fallow periods (ideally from ten to thirty years) which allow for soil fertility recovery before the field is returned to cultivation. Thus, *tavy* also involves an important component of expansion as farmers change fields (and therefore often homes) after only a few years. It has been argued that this type of agriculture is characteristic of those places with abundant land and scarce labour (Bloch 1975; Scott 2009:192), as it is less labour demanding than other techniques, such as irrigated rice farming. While often vilified, shifting agriculture has been shown to be an efficient and sustainable farming technique with low population numbers (Kull 2004:153–154).

In Madagascar, this type of itinerant, subsistence agriculture has been in the spotlight of the various ruling elites since pre-colonial times and subject to different degrees of regulation. Today, while illegal, total enforcement is not usually practised; in the area of Andasibe where TAMS took place, farmers risk fines or imprisonment if caught expanding into the forest, but they are tacitly allowed to practice *tavy* in secondary vegetation and in confined spaces. This, however, means shorter fallow periods that do not allow the soil to regain its fertility and, therefore, a constant decrease in the amount of rice harvested, and consequent poverty. Although various efforts have been made to turn people to practise irrigated agriculture in this area, these have been largely unsuccessful, in part because of 'topographic and climatic constraints' (Brimont et al. 2015:761).

Coupled with a discourse on population growth and consequent land encroachment, the view of Madagascar's unique biodiversity endangered by

*tavy* has led to what Keller has recently called a 'canonical narrative' (Keller 2015:2) around the island. Evolving from an already dispelled—yet still powerful—myth of a once fully forested island, this narrative portrays *tavy* as the main cause of deforestation and as an impending threat to the remaining primary forest, and, therefore calls for urgent, conservationist action. It could be argued that this narrative has gained an even greater force since its forests became potential 'carbon sinks' because they now appear as doubly threatened, as both biodiversity and 'carbon' value are seen to be at risk from *tavy.* TAMS emerged in this context as a forest carbon project that would save both the 'spirit of the forest' and 'forest spirits'.

*TAMS*

TAMS—*Tetik'asa mampody savoka*—has often been translated as the 'project to bring back the forest', although a more accurate translation may be 'the project to restore the fallows'. Developed, as we have seen, by Louise Holloway, it ran for about 20 years in the municipality of Andasibe[5], in the eastern Malagasy rainforest. Famous for the *babakoto*, or Indri lemur, and easy access from the capital city of Antananarivo, Andasibe is considered a 'hotspot' within a 'hotspot', and has been the object of great conservationist efforts since the late 1980s, when the Andasibe-Mantadia National Park was created.

5 And to a lesser extent in Ambatovola. I concentrate on Andasibe, since TAMS activities in Ambatovola were minimal.

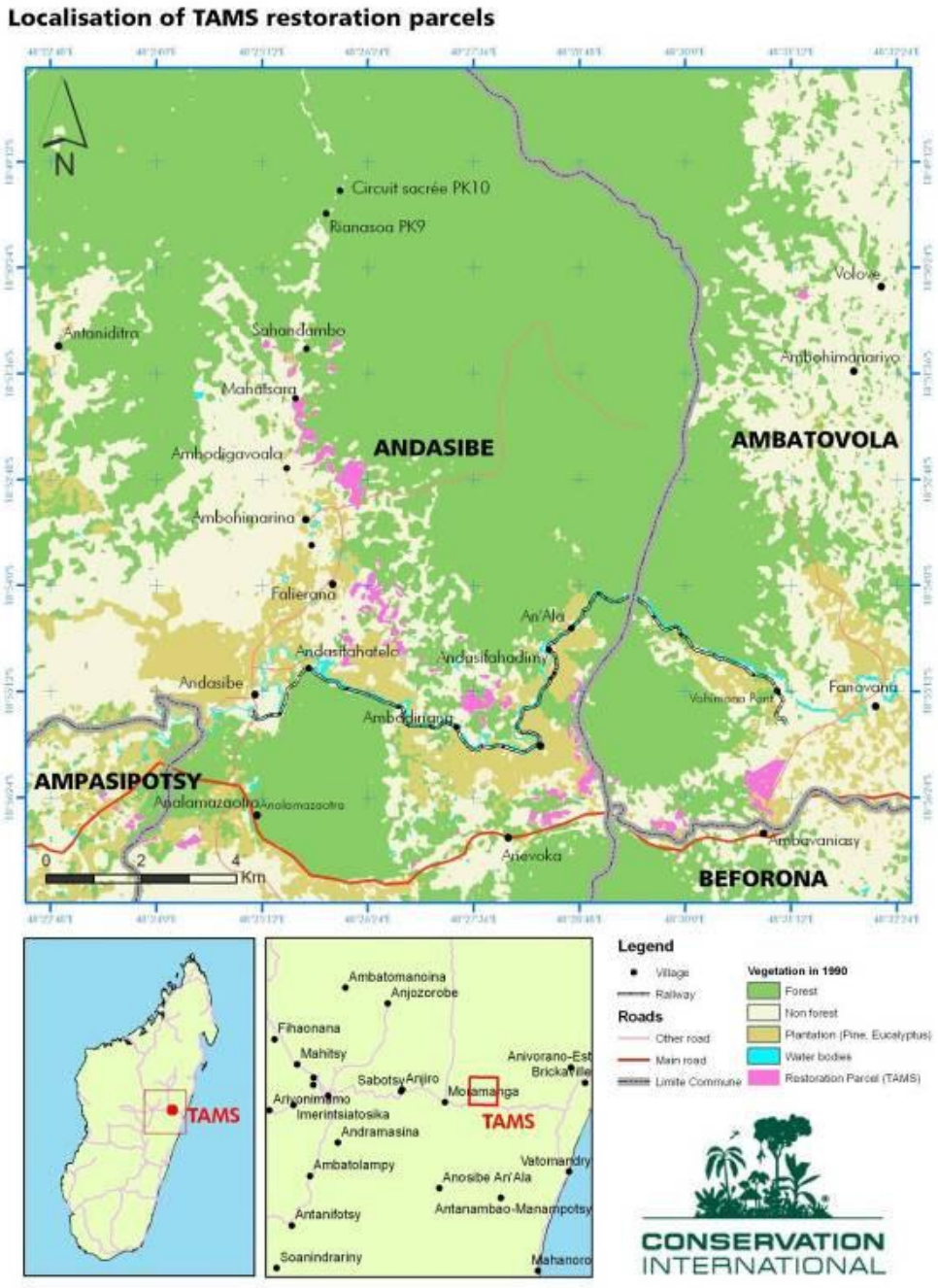


**Figure 2. Map of TAMS reforestation parcels in Andasibe and Ambatovola. Source: Conservation International**

TAMS expanded over the years in scope and number of actors, transforming from a locally-based reforestation and development project

into what was hailed as a pilot CDM project for Africa under the auspices of the World Bank's BioCarbon Fund (BioCF)[6]. It brought together Conservation International (CI), the Government of Madagascar, (GoM), the 'National Associations for Environmental Actions', (ANAE, *Association Nationale d'Actions Environnementales*), seven organizations that operated in the area and which were conceptualized as Facilitating Agents (FAs) and local communities. TAMS' main objectives were to reforest 3000 hectares of degraded fallows (reconnecting forest fragments) and to provide people with alternatives to *tavy*, both through improved agricultural techniques and through the (undefined) benefits obtained from the sale of carbon credits.

By the time I arrived in Andasibe in 2011, and six years into this 30-year long project, everything seemed to be at a halt. While some central actors claimed this was a temporary obstacle due to the World Bank's (WB) withdrawal of all but humanitarian aid after the 2009 coup in Madagascar (see chapter 2), FA workers in Andasibe insisted the project was over and would not resume. They were right. In 2012 the BioCF cancelled the 'Emissions Reductions Purchasing Agreement' (ERPA) they had signed with the government, and although CI envisaged using the trees for offset projects in the voluntary market,[7] this never happened.

Over the last two sections I have provided an introductory account of carbon as key object of global environmental governance, and of its arrival in Madagascar through forest carbon projects, and, specifically, through TAMS. All of these three histories—the development of carbon markets, Madagascar's environmental governance, and the history of TAMS—will be further explored in the next chapter. I now turn to different carbon imaginaries, through a brief account of the main ways in which carbon has

6 The BioCF was created in 2004 as part of the World Bank's Carbon Finance Unit and uses private-public funding to carry out demonstration activities of forest and agro-ecosystem carbon projects.

7 The Voluntary Market operates outside Kyoto regulation and is available to any initiating actor such as a private company or NGO. Projects can adhere to particular carbon standards for regulation and verification, and the process is generally known to be much easier than that in compliance markets, especially because it does not necessarily involve government participation.

been explored in the literature and which inform the analytical approach I have taken to its ethnographic study as part of forest carbon projects, as I detail below.

**Carbon imaginaries in the literature**

Leach and Scoones have recently qualified forest carbon projects as 'part of a more general move to address environmental problems through attaching market values to nature and ecosystems' (2015:i). This 'general move' refers to what in the literature usually goes by the name of the 'commodification of nature' (see, for example, Castree 2003), as a particular trait of what has been variously termed neoliberalism (McCarthy and Prudham 2004), post-neoliberalism (McAfee 1999) or neo-modernity (Knox-Hayes 2010). This approach has been particularly productive in the discipline of critical geography, where it has been applied to the study of processes through which previously uncommodified 'natural' elements—water (Bakker 2003), carbon (Lansing 2011) or genes (Prudham 2007), to name a few—have been incorporated into some form of market exchange.

An important precursor to this theoretical approach was an eco-Marxist critique of capitalism which postulated that environmental degradation was the inescapable result of capitalist growth and would act as the basis for its demise. Alongside capital and labour, O'Connor (1998) introduced nature as a fundamental category, and theorized about capitalism's 'second contradiction': the fact that capitalism undermined itself by destroying its own conditions of production through the degradation of its environment—both natural and social. Thus, it has been argued that, during the 1970s, capitalism began to incorporate nature into its own project by turning it into an accumulation strategy 'in its own right' (Katz 1998) in order to overcome its limits. From this perspective the commodification of nature is often considered a strategy for the expansion of the 'scale and scope of capital accumulation' (Prudham 2007:407).

This strategy has generally been portrayed as following the neoclassical environmental economics assumption that the ecological crisis is simply an accounting mistake, the result of the failure to bring the earth 'within the balance sheet' (Foster 2002:27). An example of this assumption is Sir Nicholas Stern's famous assertion during the Royal Economic Society public lecture in Manchester in 2007 that 'Climate Change is a result of the greatest market failure the world has ever seen' (Benjamin 2007). Thus, by rendering nature visible and accountable—that is, by internalizing it—and assigning market values to its different elements, it is expected that the market will allocate natural resources in the most efficient manner (see Alexander 2005 for an ethnogrpahy of environmental accounting and valuation methods).

Although there are no single approaches to the study of this type of phenomena—just as there is no single agreement as to what exactly neoliberalism is (Ferguson 2010)—a common denominator of this literature has usually been a focus on the production of exchangeable 'bits of nature' to deal with environmental degradation. A running and defining theme is therefore the fragmentation of 'natural' wholes into individuated elements and their abstraction from their spatial and temporal contexts[8] (Prudham 2007; Castree 2003).

This idea of abstraction remains a very powerful element in analyses of the 'commodification of nature' where concomitant notions of fungibility, exchangeability, commensuration and fragmentation continuously crop up. In their exploration of the emergence of biochar as a (potential) 'green commodity' in African soils, Leach et al. detail how 'soil carbon is 'chopped out' (2012:295) of its ecosystem and social contexts and revalued as a bit of nature that can be 'exchanged with seemingly equivalent bits of carbon elsewhere' (2012:302). This idea of 'chopping out' is not far from the

8 As Robertson (2000:466) argues, this idea of abstraction is of course a continuation of Marxist theory on the ways money and commodification turn the concrete into an abstraction (labourer and thing into labour-value and exchange-value respectively).

expression of 'hemming in' used by Bumpus to qualify the processes of 'individuation and functional abstraction' that bring about carbon offsets as 'units of nature that are deemed socially useful' (2011:619). Such 'displacement of nature, and its severance from sites of production and specificity', Bumpus argues, is a 'tenet of commodification' (2011:622). Yet these are not processes exclusive to the production of carbon credits. In their 'Synthesized Critique of Neoliberal Biodiversity Conservation' (2012), Büscher et al. bring together a wide array of practices (protected areas, education programmes, ecotourism, and more) as part of a general trend in what they term 'neoliberal conservation', and argue that

> 'capitalism's drive to turn everything into exchange value (commodities that can be traded) cuts up [these] connections and relationships in order to produce, sell and consume their [ecosystem's] constituent elements…To further bring conservation into capitalism is to lay bare the various ecosystemic threads and linkages so that they can be further subjected to separation, marketization and alienation' (Büscher et al. 2012:5)

A recent development in this literature has also been the turn to the study of processes of 'financialisation' as a specific and distinct phase in the commodification of nature (Knox-Hayes 2013; Sullivan 2013). In the context of environmental conservation, Sullivan has argued that this process takes two related forms: 'the turning of banks and financiers to environmental conservation parameters as a new frontier for investment' and 'the rewriting of conservation practice and understandings of nonhuman natures in terms of banking and financial categories' (2013:199–200). Carbon credits, biodiversity banks or derivative natures provide some of the most straightforward examples where processes of 'abstraction of nature into

categories amenable to derivative financialised products' can be observed (Sullivan 2013:205).

It is important to point out that the creation of 'bits of nature' and their incorporation into circuits of exchange does not just attend to environmental governance, but hinges on a more fundamental (neoliberal) turn to locate a productive potentiality in life itself (Haraway's "enterprising up of life" 1997; see also Reno 2011). As we will see through this dissertation, carbon credits in fact share important similarities with certain biotechnical objects like DNA or stem cells, where similar processes of fragmentation and abstraction take place. In the case of biotechnology and life patents, for example, Prudham has argued that 'the messy materiality of life' is rendered 'legible as discrete entities, individuated and abstracted from the social and ecological integuments ' (Prudham 2007:414). It could tentatively be argued that a key, defining trait of neo-liberalism is precisely this proclivity to re-constitute life into (supposedly) autonomous fragments as new sources of value. If the post-Fordist economy's main aim is that of turning 'life' into 'surplus', as Cooper (2008) has argued, the only way this can be achieved is through processes of fragmentation and abstraction: that is, by bringing 'life' into calculative spaces that render it legible and separable (Mitchell 2002; Callon 1998a). The 'newness' (Newell, Boykoff, and Boyd 2012) of carbon credits and other fragments of commodified nature may partly lie in the way these objects claim to transcend nature's 'fictitious character' as commodity, as elements that *can* actually 'be detached from the rest of life, be stored and mobilized' (Polanyi 1957:72).

Of course, as Lohmann has argued, all 'commodities-in-the-making are different' (2014:158), and respond to multiple and varied processes that aim to bring them about. In his thorough analysis of this vast literature Castree (2003), for example, distinguishes between four different types of commodified nature(s) (external, internal, the human body and information) and six different processes or qualities of commodification (privatization, alienability, individuation, abstraction, valuation and

displacement). Similarly, Robertson (2000), in his exploration of wetland mitigation programmes in the US, reminds us that the specificities and materialities of different commodified natures matter greatly. Wetlands, he argues, as 'embedded features in the landscape' appear as a 'qualitatively different element of nature for capitalization than, say, grain or genes', and their 'place-specificity' creates a 'signature tension for the process of commodity abstraction' (Robertson 2000:466).

My analytic approach to the ethnographic study of 'carbon' as key object of contemporary forms of global environmental governance follows Robertson (2000) in paying special attention to the specificities of the element to be commodified, or made into tradable bits, and its consequences. The 'signature tension' of forest carbon projects, I argue, is in fact a very particular one: in order for 'carbon' to emerge as abstract and fungible bits of nature, a great amount of grounded and unique nature also has to be put in place. This is not just a matter of the messy practicalities of bringing 'carbon' as commodity into being—its 'uncooperativeness' (Bakker 2003), as it may be called—but is a much more fundamental aspect of the 'tradable bits' that forest carbon projects are supposed to create: the Certified Emission Reduction (CER) or carbon credits.

*Grounding and abstracting nature*

It is essential to bear in mind that, while often referred to as 'carbon sinks', what forest carbon projects aim to produce is not CO2 per se, but rather its 'reduction' or 'offset' expressed as a *tCO2e* (a tonne of CO2 equivalent). Although I follow in detail the specifics of this element and its 'making' in chapters 3, 4 and 7, I here want to draw attention to its basic characteristics, in order to show the type of grounded nature that projects such as TAMS need to produce for credits to emerge.

A 'carbon offset' project operates under the fundamental assumption that emissions in one place and time are compensated by reductions in

another. For emissions reductions to occur [9] the project needs to demonstrate that it is 'additional'—that is, that emissions reductions would have not happened without the project's activities, or, what is the same, that emissions would have been released in the absence of carbon finance to carry out the project (Bumpus and Liverman 2008). In addition, the number of offsets obtained (measured in tons of CO2 stored in trees), must be calculated against a 'baseline', a mean projection of the past 15 years or so of deforestation trends into the future[10]. Forest carbon projects are therefore premised on what Lohmann terms a 'counterfactual scenario': a 'single, counterfactual storyline' (Lohmann 2014:171) from which expert calculations—and therefore carbon credits— can follow. But this counterfactual scenario is not the only requisite that forest carbon projects such as TAMS need to meet. As part of the CDM, projects also need to provide some form of 'sustainable development'. In TAMS, this meant conserving biodiversity and providing alternative livelihoods to *tavy* farmers for a period of thirty years[11]. While carbon credits may be abstract and decontextualized fungible elements, they can only come about through alternative forms of carbon that have a past, a present and a future and exceed their monetary value in markets.

This is not just a discursive move, for it materializes through the fundamental act of rooting trees to specific landscapes, where carbon becomes unavoidably entangled with their socio-material and historical relations (Leach and Scoones 2015:2). This, as we will see through the dissertation, has fundamental consequences for the different ways in which carbon is produced, experienced and understood. The 'signature tension' of forest carbon projects is therefore that in order to produce tradable bits of

9 I am here referring to CDM projects. Voluntary market projects follow diverse guideline although they do operate on the same offset or reduction basis.

10 As Lohmann succinctly puts it: 'The credits generated by a greenhouse gas-saving project built as a result of carbon finance are calculated by subtracting the emissions of a universe with the project from the emissions of a hypothetical 'baseline' or business-as-usual universe' (2009:509).

11 The specifics of forest carbon projects, as we will see, also bring very particular and tricky temporalities into play.

abstract nature, that is, in order to fragment or deracinate, one first has to root: the carbon credit cannot exist without it being something else entirely (and permanently) different. Carbon *needs* to be multiple.

In a sense, this multiplicity could be seen as a case of 'proliferation' in Hayden's terms, as she demonstrates how, in apparently reductionist projects such as pharmaceutical generic substitution, the making of 'sameness'—an assumed archetype of scientific, and, as she argues, capitalist reductionism—'generates, and proliferates difference' (2012:275). 'Pharmaceutical sameness', Hayden argues, 'can explode into multiplicity' (2012:280).

*Carbon's multiple social lives*

In *The Social Life of Things* Appadurai (1986) offered a new perspective on the long-standing gift/commodity dichotomy by arguing for an analysis of the processual flow of objects in and out of commodity status. The 'commodity phase' therefore appeared as one moment in a thing's 'social life', a trajectory that could be 'slow or fast, reversible or terminal, normative or deviant' (Appadurai 1986:13). A focus on the cultural biography of things thus revealed that 'the same thing may be treated at one time as a commodity and not another' or 'treated as a commodity by some persons, and not others' (Kopytoff 1986:64). The key was to follow and explore things 'in motion' (Appadurai 1986:16).

While insightful, this approach is complicated when applied to the carbon of forest carbon projects. As we have seen above, carbon's trajectory is not a processual one in which at one stage it is a tree, and at another a credit. Rather, carbon's commodity status as credit can only come about when it is also something else entirely (i.e. a tree, a form of development). Similarly, talking about different perspectives on the same thing only gets us so far because, as we will see throughout the dissertation, locating this thing often becomes problematic: carbon in TAMS was often experienced as an elusive object hard to locate, with a tendency to 'disappear' from view (see

chapter 6). Rather than taking carbon for granted as a pre-existing coherent and single whole, then, I partly draw on a recent approach to things and objects that treats them as multiple and enacted in practices (see, for example, Mol 2002a; Law 2002; Lien and Law 2011). I thus follow Mol's call to 'refrain from understanding objects as the central points of focus of different people's perspectives' (2002a:4) and to rather focus on how 'objects come into being—and disappear—with the practices in which they are manipulated' (2002a:5). In its foregrounding of objects and the socio-material practices through which they come about, this approach reveals their multiplicity: the many and simultaneous ways in which things are being 'done' and 'known'. It is thus that I talk about the 'multiple social lives of carbon', as a way of dispelling the 'feigned immobility' (Harvey 2013:3) of carbon as single and coherent whole.

While this approach allows Mol to explore ways in which multiple enactments of atherosclerosis are often made to 'hang together' (2002a:5) through practices of coordination—as well as ways in which incoherences are sometimes 'lived with' (2002a:87)—I think it also offers an interesting way of exploring those cases where things do not stabilize. As we will see, it could be argued that part of TAMS' failure lay in the impossibility to make carbon 'coalesce' into an object 'with clear borders and a solid core ' (Knudsen 2014:64), resulting in experiences of elusiveness and complexity (chapter 6 and 7). But I also extend Mol's (2012) approach in arguing that not only is the carbon of forest carbon projects a multiple object enacted in different ways simultaneously—a natural resource, a commodity, a form of development, etc—but, rather, that it often *has* to be multiple in order to produce the kind of value it proposes: its abstract form as carbon credits can only come about through a very specific set of grounded practices that bring together people and things in forest landscapes. Some of the multiple social lives of carbon are therefore deeply intertwined and related (see Knudsen 2014 for a similar approach), although these social lives are not, of course, the only ones (as we will see in chapter 5).

So what kind of nature emerges from this perspective? We have known since the 1980s that the concept of nature is not one that travels well (Strathern 1980). The idea of an external 'natural' world separate from humans loses plausibility in places like Mahatsara (see Descola and Pálsson 1996:7–9), where the concept of the 'environment', *tontolo iainana*, for example, is one only understood in the context of conservation, but not as part of daily life (Sodikoff 2012a:87). But we have also seen how the concept of nature as a fixed realm distinct from humans does not even work in the West, as it can no longer be taken as a biological given or 'fact' (Strathern 1992; Franklin 2003). The 'nature' that emerges from 'carbon's multiple lives should rather be seen as an object in motion, coming into being through simultaneous material and discursive practices: 'it shifts its shape and form from practice to practice. It is done multiply' (Lien and Law 2011:83). Instead of assuming a fixed point from which different meanings or representations of carbon (and hence nature) are derived, it is more fruitful to explore how things are made to appear as a series of fixed points—and with what effects. If particular framings of 'nature' and 'carbon' are based on very specific ways of articulating people's relationships to each other and their environments, then the question remains of which other possible worlds, and futures, are being negated. This is the question I will explore in the conclusion (chapter 8), as I bring together the temporal implications of carbon in forest landscapes that appear throughout the dissertation.

In this section I have presented a rationale for the study of the multiple social lives of carbon in forest carbon projects. Through her often-cited phrase of 'selling nature to save it', McAfee has illustrated the transformation of nature into 'world currency' as 'natural capital' (1999:133) and its integration into various types of markets as a way of dealing with environmental degradation. The type of nature that emerges, in her view, is 'of a very particular type: an abstract, 'globalized' resource torn out of its spatial and social historical contexts' (1999:137). While this is

certainly a key consequence of such processes, it is not the only one. As I have argued, along with processes of fragmentation and abstraction inherent to the commodification of nature, forest carbon projects also involve the production of very specific and grounded forms of nature that become entangled with socio-material contexts. As we will see in this dissertation, in the process of 'saving' forests through an abstract and mobile form of carbon—the carbon credit—other forms, with firm attachments to local contexts, emerge.

**Summary of chapters:**

I have divided the ethnographic section of this dissertation into three parts, according to the specific forms, or social lives, of carbon that are explored in the chapters that compose them. Part I (chapters three and four) explores the social life of carbon in its credit form. Part II (chapters five and six) focuses on the specific experiences of people in Mahatsara that come about through carbon in two different guises. Part III (chapter seven) moves on to explore carbon in its (unfinished) commodity form. Since I provide an introductory account of the chapters at the beginning of each section, I here present them very briefly.

The rest of this chapter provides an account of my methodological approach to the study of the multiple social lives of carbon as part of TAMS.

I then present, in chapter two, 'three histories' that help us understand the emergence of TAMS as forest carbon project in Andasibe and that attend to its multiplicity. I therefore explore the historical development of carbon markets, the specific forms of forest management in Madagascar from pre-colonial times to the present, and the history of TAMS, as told by its main designer, Louise Holloway.

In chapters three and four I approach the social life of carbon through its credit form, in its interplay with questions of value and waste in relation to forests and *tavy*. Chapter three traces the transformations that TAMS

underwent through its engagement with carbon markets, and explores the effects of carbon credits' logic of value in the project's understandings, and treatments of, value and waste. Chapter four presents a historical overview of Andasibe's forests in relation to past political and economic projects, and the role that *tavy* has played in each era. We will see that, while often portrayed as a completely new form of value production, carbon credits as part of TAMS established very specific historical continuities in these landscapes.

Chapters five and six explore the social life of carbon as an unstable and sometimes hard to discern object as experienced by villagers in Mahatsara. In chapter five, carbon appears as an implicit element in experiences of what I term the 'environmental state': a form of spatial and temporal oppression that results from conservation practice and its curtailment of movement and agricultural expansion. Chapter six, on the other hand, explores carbon's (im)materiality as natural resource at the point of 'extraction'. A focus on carbon labour among men in Mahatsara—and its contrast to past work experiences in graphite mining—reveals issues of temporariness, volatility and dislocation from the local that coalesce into an experience of carbon and TAMS as a 'scam'.

Chapter seven moves on to TAMS' key actors' experiences of complexity as they try to separate or disentangle carbon from the relations in which it is rooted in order to bring it into being as a bounded and mobile commodity. Through the case of carbon ownership we will see how this abstracting process is constantly complicated by carbon's multiple—and necessary—socio-material entanglements.

A running theme throughout many of the chapters, as we will see, is that of time. Chapters three and four, for example, expose the various pasts, presents and futures that make up, and, at the same time, are made through, carbon credits in Andasibe. Chapter five, on the other hand, dispels the conservation/development myth that Betsimisaraka farmers lack a future orientation by presenting the ways in which people think about, and act on,

their own socio-natural futures. I will show how the curtailment of spatial and temporal expansion through a ban on *tavy* is therefore experienced as a powerful form of oppression. To a lesser extent, the theme of time is also present in chapters six (through feelings of temporariness in carbon labour) and seven (through past and future entanglements that complicate the becoming of carbon as commodity). In chapter eight, and by way of conclusion, I bring together, and further explore, the mutual and productive connections between carbon and time at a more abstract level. I will argue that, as key object in contemporary forms of environmental governance, carbon attends to, and at the same time aims to re-work and overcome, temporal limits to capitalist growth. Its effects, I suggest, are those of foreclosing the future for some, while opening it up for others.

I have also included three appendixes to aid reading. Appendix I presents TAMS' main actors and their roles in the project. Appendix II details the key elements and concepts that make up a CDM project, and which are explored in the dissertation. Appendix III provides a brief timeline of Madagascar's political history from pre-colonial times to the present. After that there is a small glossary of the most recurrent or relevant Malagasy terms that appear throughout the dissertation.

**Fieldwork:**

In this section I present the different research methods that I employed to study carbon in a specific locale. I begin by setting out the main rationale for my methodological approach. I then give a general background of Mahatsara, the village where I conducted fieldwork, and explore the kinds of 'situated knowledges' (Haraway 1988) that my research practices allowed, including practical and ethical problems encountered. Finally, I note other sites and sources I drew on.

The ethnography presented in this dissertation is the result of an 18-month stay in Madagascar, divided into an initial period of 12 months in

2011, and another 6 in 2013. Additionally, I carried out three weeks of archival research at the National Archives of Overseas Territories, AOM (*Archives Nationales d'Outre Mer*), in Aix-en-Provence, France during 2014. This was complemented by online research and other archival and project-based documents collected in Madagascar[12].

The methodological approach I have taken to the study of 'carbon' as key object in global forms of environmental governance follows Tsing's call to study global phenomena or connections 'in the sticky materiality of practical encounters' (2005:1). Although this could of course have been done from many different sites, my interest in the intersection between carbon and *tavy* led me to a small location called Mahatsara, 14 kilometres north of the town of Andasibe, where farmers had both taken part in, and given fallow land to TAMS. I arrived in the village after six months of language learning and preliminary research in the capital city of Antananarivo, and stayed for an initial period of six months, between June 2011 and January 2012. During this time, my assistant Mahefa (whom I introduce below) and I would spend most of the week in the village, travelling every four or five days to Andasibe for a night or two. During the second stage, between February and June 2013, I visited Mahatsara daily, spending nights in Andasibe as I was then travelling with my one year-old son. This time division allowed me to experience the agricultural cycle in Mahatsara almost in its entirety[13], and to study TAMS at two different stages: during a perceived 'halt' in 2011, and as the project had (more or less officially) come to an end.

Andasibe, on the other hand, was not simply a place to rest, but a productive location to approach TAMS through the rumours and news that circulated in town—mostly among TAMS workers but also with villagers in general. In addition, I attended key events in town where multiple actors came together, such as the National Environmental Day 2011 or ANAE's 20th

12 My knowledge of French was helpful in navigating the archives in France, but less so in Madagascar, where I learned Malagasy to conversational standard and was greatly helped by my assistant Mahefa.

13 Burning and sowing stages during 2011, and the harvesting season in 2013

anniversary, which provided important insights into the project that were not available in Mahatsara.

I also carried out fourteen semi-structured, taped interviews among TAMS organizational actors, as well as more informal, un-taped conversations with local TAMS workers in and around Andasibe. Interviewed actors ranged from local, regional and national administrative staff to representatives of every organisation involved in TAMS at a national and international level[14].

Borrowing Hayden's sentence, it could be argued that I followed the '*multi-sitedness* built into' (2003:9) TAMS as a project that cut across different places and scales—but I do not consider my research as an instance of multi-sited ethnography (Marcus 1995) in the strict sense of the word. Rather, my approach was to remain grounded in a single location and follow the ramifications of TAMS from this specific locale. This revealed not just connections to other spaces and scales, but also a great amount of disconnections, gaps and absences, which I have included as part of my analysis. The field site, from this perspective, involved Mahatsara as 'carbon' location, but exceeded the spatial boundedness of the village as 'locality' (Gupta and Ferguson 1997) through dis/connections.

It is also somewhat ironic that I never actually got to see 'carbon in-the-making'. By the time I arrived in Mahatsara, TAMS was no longer operative and never resumed. Far from a hindrance, however, this turned out to be a very productive way of approaching the social lives of carbon, for various reasons. On the one hand, as we will see, the end of TAMS made much more evident the absence of a coherent and stable object called 'carbon'. On the other, the fact that the project was no longer running granted some actors,

14 Taped interviews included the following: The Mayor of Andasibe; staff at Association Mitsinjo (Andasibe); staff at the Regional Forestry Service CIREF; staff at SAF-FJKM Moramanga; the director of the National Land Reform (PNF); staff at the General Office of the Environment (DGE); staff at the General Office of Forests (DGF); staff at Conservation International CI; staff at ANAE; staff at the World Bank and the BioCF; Louise Holloway. Notable absences are Mr. B. Rajaonson, from the World Bank's BioCarbon Fund office in Madagascar, whom I could not locate and Mr. J MacKinnon (CI) and staff at Madagascar National Parks (MNP) in Antananarivo, who did not agree to see me.

especially those involved in TAMS organisational structure, a kind of detachment and heightened reflexivity on the project and its many 'complexities'[15]. The absence of TAMS and carbon, then, allowed very important presences, as fieldwork became a sort of cartographic exercise into the traces and memories, confusion and absences that the project had left in its wake.

In order to understand my methodological approach (mainly based on participant observation, as I detail below) to the study of TAMS in Mahatsara and my positionality as researcher, I now introduce the village and those specific characteristics that are relevant to methodological issues.

*Mahatsara*

Mahatsara is situated 14 kilometres north of the town of Andasibe, and opposite the AMNP[16].

15 This was especially true towards the end of my research period, and evident in the last round of interviews I carried out among TAMS actors, who appeared much more open than in previous encounters.

16 Although I considered other locations as potential field-sites, Mahatsara's particular characteristics as home to re-settled families seemed to open up avenues of research in case I was confronted with a total absence of TAMS.

**Figure 3. Mahatsara seen from its highest point. Photograph taken by author in September, 2011.**

It was formed in 2001, when Madagascar National Parks (MNP, previously known as ANGAP) resettled about 50 households (made up of about five groups of extended families) comprising 480 inhabitants, who were at that time living within the confines of the newly established protected area. As I explain in chapter six, Mahatsara was initially hailed as a pilot village that would demonstrate the mutual benefits of development and conservation, although promises of development infrastructures and benefits soon dissipated. Households were allocated a proportional number of hectares for agricultural purposes. As is generally the case in rural Madagascar, status in the village is importantly related to land access. Thus, while a small number of families[17] were able to obtain the best fields on the village's eastern perimeter, which, being by the river makes them ideal for

17 These were most likely those with close ties to the *Tangalamena*, or village chief, or with higher status before they were relocated.

irrigated rice agriculture, *tanimbary*, most people were allocated fields inland, to the west of Mahatsara. Although a dam was supposed to carry water to these areas, villagers claim that it broke soon after it was built and water does not reach their fields. In any case, these fields are mostly dedicated to dry hill agriculture, or *tavy*, used to cultivate rice and, to a lesser extent, corn. Some families also have home gardens, or *tanimboly*, where they plant alternative (sometimes cash) crops, such as beans or cassava. Those who arrived later on had to buy or rent pieces of land, and make up the poorest strata of the village, although, as Graeber (2007) has noted for the small village of Betafo in the central highlands, the difference between rich and poor families is very nuanced. In any case, as we will see in chapter six, Mahatsara's inhabitants, while often portrayed as subsistence farmers, have a long tradition of wage work for the now extinct graphite mining industry.

The majority of Mahatsara's inhabitants are Betsimisaraka but there is also a small proportion of Bezanozano, the area being a geographic border between these two ethnic groups, who are mainly differentiated by the type of agriculture they practice (*tavy* for the former, and irrigated rice agriculture for the latter, a result of the changing landscape from the western plateau to eastern mountains; see Astuti 1995; Bloch 1995). Ethnic divisions in this area, however, are not exclusionary and marriage between both groups is common. Most villagers still identify as practising *fomban-drazana* or ancestor worship, although there seems to be a growing tendency to join the emerging 'evangelical' movements[18], especially among younger generations.

Around 2007, the village was included as part of TAMS, and was to be managed by the organisation SAF-FJKM, (*Sampan'Asa momban'ny*

18 Pentecostalism or Seventh-Day Adventism are growing in size in Andasibe, which also houses a Catholic and Protestant Church, and a Mosque.

*Fampandrosoana* FJKM[19]) as Facilitating Agent. Sixty-three men took part in reforestation work in and outside the National Park, and around twenty of them gave fallow land to TAMS. They signed a contract with ANAE and the regional forestry service, CIREF (*Circonscription de l'Environnement et Forêts*), in which they agreed to leave the land intact for the 30-year duration of the project. In exchange, they claim, they were promised work and the money from 'carbon credits', which would start to flow within five years of reforestation. This, however, never happened.

An important reason for the selection of Mahatsara to take part in TAMS was its status as pilot village and the active role of the *Tangalamena*, the village's spiritual leader and chief vis-à-vis the state[20]. The *Tangalamena*'s involvement with conservation and development initiatives has a long history, and goes from outright opposition to resettlement in the early days of the National Park, to a strategic yet complicated acceptance of conservation goals and initiatives. His current relationship to the state and conservation is in fact a peculiar and interesting one, revealing important intricacies of power dynamics in the village, as I detail below. As the head of the family into which I entered as researcher, in turn, his role in the village is fundamental to understanding my own positionality in Mahatsara.

19 SAF-FJKM is the development division of the Madagascar Church of Jesus Christ (Protestant).

20 A CI technical worker once described to me the *Tangalamena*'s family as a 'pilot family', due to their interest and participation in conservation.

*The Tangalamena, key mediator of power in the village*

**Figure 4. Mahatsara's Tangalamena (in red, holding a baton), conducting a sacrifice ritual. Photograph taken by author in July 2011.**

For Betsimisaraka, the *Tangalamena* is one of the elder (usually male) members of an extended family who share a tomb. He is traditionally in charge of the spiritual connections with ancestors, settling disputes within the family and was once responsible for dividing and blessing the land to be worked. His power, which derives from his ability to act as mediator between the living and the dead, tends to be contrasted with the power of the state, as two distinct and contradictory spheres: if the *Tangalamena* embodies a legitimate form of authority based on ancestral custom, this is usually contrasted to the power of the state, largely considered illegitimate (a common feature of rural life in Madagascar, see Graeber 2007). Mahatsara's peculiarity as both 'manufactured' village and home to separate groups of extended families has led to a peculiar situation in which each extended family may have their own *Tangalamena* (although not all of them do), but there is one who is recognized as leader vis-à-vis the state. The term

*Tangalamena*, in his case, has acquired a new and ambiguous meaning, being both a figure of authority for ancestral matters, and for administrative ones[21], even when these two forms of authority are seen as antagonistic by villagers. This peculiar situation gained a further twist as he was elected in 2013 Falierana's *Chef de Fokontany*, the head of the smallest administrative unit to which Mahatsara belongs. Although there is no overt conflict in the village in this regard, there are many tacit forms in which the *Tangalamena*'s authority is contested, a result of his awkward engagement with administrative power.

Two key elements must therefore be highlighted in order to understand the spaces that opened up or closed down for me as researcher. The first is the villagers' essential distrust of external authority which is mainly experienced through regulations over *tavy* and a history of displacement and failed promises[22]. The other is the awkward position of the *Tangalamena*, and the consequent tension in power relations in the village, and with which I became entangled as I arrived in Mahatsara.

*Positionality and participant observation in Mahatsara*

One of my key aims when I arrived in Mahatsara was to distance myself as much as possible from TAMS and conservation practice in general in order to gain some kind of legitimacy and access to critical views of the project. Instead of arriving through TAMS—in one of ANAE's visit to the village, for example—I chose to take the administrative route, as I asked for permission from the Vice-Mayor of Andasibe and later the Chef de *Fokontany* of Falierana, who sent me to the village with a red-stamped letter to hand to the *Tangalamena*.

With hindsight, I realise that both the conservationist and administrative routes to Mahatsara were thoroughly intertwined, and choosing one or the

21 Such as getting permits to visit tombs in the Park.

22 In chapter five I describe this amalgam of external actors as 'the environmental state' and present their oppressive force as is experienced in Mahatsara

other did not make much of a difference. Whichever way I arrived in Mahatsara, I arrived as a *vazaha*, or white foreigner. I did it, in turn, in the company of a male assistant, Mahefa, who was of Merina origin (the ethnic group from the highlands who also form the main elite in the island), an ethnicity inextricably associated to the external exercise of power[23]. Whether I liked it or not, then, we were squarely situated within both administrative and conservation imaginaries. These were only (partly) dispelled with time and, I believe, with participant observation's most powerful tool: the cultivation of social relations through everyday practice. It was only as friendships were forged through everyday involvement in mundane tasks that some form of trust emerged and opened up spaces that had been previously off bounds.

But even as we were able to dissociate ourselves from conservation practice to a large extent, did this not mean we were free from other forms of associations to authority and power. As we were lodged in the house of the *Tangalamena*'s youngest daughter, right below the *Tangalamena*'s home, also known as *trano lapa* or 'palace', we also became very specifically positioned in Mahatsara's internal political landscape, and inherently linked to the *Tangalamena*'s family during our whole stay in Mahatsara. Although this was to be expected, and I could not have entered the field otherwise, it is important to note that my relationship with the *Tangalamena* and his family did foreclose other relationships, or at least information, in the village. Thus, I am firmly convinced that the reason why I never heard any explicit complaint about the *Tangalamena* was because I was considered his close ally. This, however, does not mean that I was not able to see conflict in the village, for it arose in other forms[24].

Mahatsara's particularity as manufactured village, and people's resentment towards the state and other forms of external authority, meant

23 As is general in Madagascar, Merina workers held all of TAMS' national or regional level positions.

24 Many of these, however, I cannot share here for privacy reasons.

that certain forms of research were simply out of the question. As Graeber explained in relation to his own research in the rural location of Betafo, 'techniques of knowledge were very closely identified with techniques of rule' and 'certain sorts of inquiry' (2007:15) made people feel much more confortable than others. In my case, this meant avoiding any kind of cadastral inquiry, 'door to door' statistical collection (something also mentioned by Graeber) or participatory research techniques such as focus groups—a strategy often used by conservation/development actors, and hence symbolically charged. We carried out taped, semi-structured interviews among fifteen different households although some of the most interesting comments always seemed to spring up at unexpected moments, often in conversation between people. The fact that these were held in my presence, however, already points to a relative success in establishing trust and openness, I think. When a spontaneous conversation turned into an unexpected informal interview, I avoided taking out my recorder in order not to change the tone or direction of the conversation, and just jotted down the most relevant points and wrote them up later[25].

In any case, as a result of everyday practice, I spent most of my time with women—working the fields, attending to children (especially during my second stage, as I was then with my own child), fishing or simply hanging out—which takes me to the question of gender. With hindsight, it looks like a tremendously good choice to have been accompanied by a male assistant, as it opened up a whole side of research that might have been relatively off bounds. Although gender roles and relationships are not too strict in Madagascar, there were certain areas that I might not have been able to enter without the company of a man. On the other hand, my gendered position turned out to be a very positive element because women's role in TAMS was non-existent, at least in Mahatsara. Participant observation among them, then, gave me a much more balanced perspective. When

25 Every quote that appears in this dissertation and goes beyond a sentence or two comes from recorded material.

outside organisations visited the village to give talks or presentations, for example, I became aware of how gender structured access to conservation work and practice in the most basic ways: as I joined women in the back rows during talks, I realised that most of the time, one could hardly listen to what was being said due to both distance and the racket of babies[26].

Apart from participant observation in everyday situations, including agriculture, we also attended five ritual events in Mahatsara. The first one, *dika ra*, or 'the crossing of the blood', took place during my first week in the village and involved cattle sacrifice in order to bless the family of a man who had married a woman far away from the village. We then attended two funerary rites performed at *Fête des Morts*, around November 1st, by two different families with their respective *Tangalamenas*. The last two rituals, on the other hand, involved one specific family and Mahatsara's *Tangalamena* as conductor: a spirit possession session, or *tromba*, at a sacred waterfall inside the Park, and the *vonivao* or 'new seed ritual', explored in detail in chapter five.

*Other sources of data:*

Apart from fieldwork and interviews in Mahatsara and beyond, I have also drawn on other materials to complement the data gathered. Grey documents played a key role in TAMS and I refer to them in various chapters. The most important ones were the Project Design Document, (PDD) which is still available at the UNFCCC website (CDM, UNFCCC n.d.), the contracts between farmers and the project that I was able to access in Antananarivo, and the 'carbon property' document '*Note on the legal nature of carbon property rights and on carbon credits. Proposal to draft a Protocole*

26 Bearing in mind that these were not fixed, clear-cut divisions, I have aimed to represent both male and female experiences of TAMS and 'carbon' in this dissertation. Thus, chapter 5 gives a bit more weight to key commentaries made by women, as I approach 'carbon' through the lens of *tavy* and social reproduction, whereas chapter 6 focuses on male experiences of carbon labour, even if women's perspectives on the project as scam are also present.

*d'Accord (Implementation Agreement)'*: a very hard to get document that I have been able to obtain thanks to the on-line Madagascar Environmental Justice Network, MEJN.

In Antananarivo I visited the National Archives, *(Foiben'ny Arisivam-pirenena Malagasy*) and the National library (*Tranom-bokim-pirenena*) for historical records of the area of Andasibe, although without too much success. For TAMS or carbon/conservation-related historical and contemporary information I visited the library of the National Office for the Environment (*ONE, Office National pour l'Environnement*), the library at the Ministry of Environment and Forests (MEF) in Nanisana, the library at the World Bank offices in Antananarivo and the library at *ESSA-Forêt*, the Water and Forest Department at the Agronomy School at the University of Antananarivo. For historical pictures and maps I visited Madagascar's Geographic Institute, FTM (*Foiben-Taosarintanin' i Madagasikara*).

In October 2014, I carried out three weeks of archival research at the National Archives of Overseas Territories, AOM (*Archives Nationales d'Outre Mer*), in Aix-en-Provence, France. My interest here was in finding information on Andasibe's very early origins and its relationship to the colony. The information collected here is presented in chapter four.

*Ethical considerations*

Due to the nature of this research, and to both TAMS and Mahatsara's specific characteristics, I have not been able to provide pseudonyms for either the project, the organisations involved nor Mahatsara. I have nonetheless changed the names of every actor in the village in order to protect their identity, or downplayed or slightly modified their features so that they may not be recognized. Taped interviews among organisational actors involved informed consent forms, with the possibility of providing information anonymously. In such cases, I have omitted their names and job positions. Informed consent in Mahatsara, on the other hand, was approached as a processual negotiation, and I have therefore excluded any

type of information or comment that I have deemed inappropriate to be made public. An essential person whose name I have not been able to modify is the *Tangalamena*, for obvious reasons. I have aimed to make very explicit, however, the fact that villagers' views on TAMS were not necessarily shared by him. In an effort to avoid any future conflict, the *Tangalamena* appears in this dissertation mainly as an authoritative figure on ancestral matters. I hope he is happy with my rendering of his knowledge. Any mistakes are only mine.

# Chapter Two: Three Histories

## Introduction

In this chapter I provide a historical account of carbon as part of TAMS in Andasibe/Mahatsara that attends to its multiplicity, by focusing on three different, yet intertwined, trajectories. My aim is to grasp carbon as multiple object, by tracing its emergence in global forms of environmental governance, while at the same time grounding it historically within the development of conservation practice in Madagascar, and, more specifically, as the main object of the specific and contingent 'assemblage' (see Li 2005; Marcus and Saka 2006; discussed below) that was TAMS.

As we will see in this and the next chapter, TAMS did not emerge fully formed as a forest carbon project, but rather transformed into one over almost two decades, from the early 1990s to the late 2000s. In order to appreciate this transformation, and to grasp the role of carbon in TAMS more fully, we need to look beyond Madagascar, and back to debates over the management of waste and pollution that took place during the mid-20th century. Similarly, as we will see, TAMS as forest carbon project cannot be solely apprehended as the result of 'global' forces encroaching on the 'local' in a coherent and organised way, or as the effect of its designers' commitment to carbon markets. The story of TAMS, and carbon within it, is much more messy and contingent. In the following sections, then, I follow the 'makeshift links across distance and difference' (Tsing 2005:2) that made carbon the protagonist of Andasibe's entry into the 21st century.

I begin with the emergence of the carbon dioxide molecule in scientific circles, and trace its transformation into a key socio-technical and economic object for climate change mitigation that responds to debates over the most appropriate forms of managing waste and pollution. I then move on to a

historical account of environmental management in Madagascar, from pre-colonial forestry legislation to the country's current engagement with carbon markets for conservation. We will see how post-colonial Madagascar is a very particular place, not only in terms of its endemic flora and fauna, but also in number and diversity of actors and the specific clusters of power that have formed around the country's environmental governance structure. I finally present the history of TAMS, mainly through the lens of its designer, Louise Holloway, and introduce the main characteristics of both the project and the area of Andasibe (the history of Andasibe is presented in detail in chapter four). I finish with some concluding remarks on the ways we may think about TAMS as forest carbon project, as I elaborate on the concept of 'assemblage'.

**From molecule to credit**

Awareness of the role of CO2 on the earth's changing temperature dates back to 1896, when the Swiss electrochemist Svante Arrhenius argued that fluctuations in the concentration of carbon dioxide in the atmosphere were connected to changes in terrestrial temperatures. Twenty years later he predicted, following his colleague Elkholm, that CO2 levels in the atmosphere 'might noticeably increase' within a few centuries as a result of the exponential rise in industrial carbon emissions that had begun with the take-off of the oil industry in the mid-nineteenth century (Calel 2011:5)**.** But Arrhenius' theories were discarded during the following decades, until Callendar, a British engineer who had spent over a decade collecting data, successfully revived his postulates in the 1940s. Military funds for climate science significantly increased at this point, particularly in the US, where a new generation of climate scientists began to develop sophisticated data, models and technologies for the study of carbon dioxide's impact on the earth's climate (Calel 2011:6). At that point, however, it was still unclear whether greenhouse gas emissions would cause a cooling or warming of the

climate (Lohmann 2006:35). Concern over the effects of anthropogenic disturbance of the earth's climate grew over the 1970s. A turning point was the 'first major international conference on the greenhouse effect' held in Vienna in 1985, where 'climatologists warned of a rise of global mean temperature' in the first half of the 21st century and 'up to a one-metre rise in sea levels' (Lohmann 2006:35). The alarm, Lohmann argues, did not just ring among climatologists, but also among the US Government, who began to steer climate research from independent researchers toward 'technical bureaucracies' (2006:35) with closer links to governments. Thus, in 1988 the Intergovernmental Panel on Climate Change (IPCC) was founded under the auspices of the UN, with the aim of developing 'a comprehensive scientific assessment of the causes and consequences of global warming' (Calel 2011:15).

The origins of carbon trading as a mechanism to deal with climate change are not located, however, in the field of climate science, but in that of economics. More specifically, carbon trading is the result of a debate over the most appropriate ways of dealing with pollution and the role of the state in its management. This conversation is usually traced back to Cambridge-based economist Arthur C. Pigou, who, in the 1920s, argued for a tax per unit to be imposed on private entities with negative social outcomes, as part of his 'welfare economics'. Pigou, in fact, employed the example of smoke emitted by a factory that harmed consumers to describe negative social costs (or externalities), which, he argued, should be corrected by taxing policies (Sandmo 2015:20).

This approach transformed during the 1950s as a result of the rejection of Keynesian state-interventionist methods by the Chicago School of Economics. The idea of emissions trading was in fact grandfathered by one of its most prominent members, Ronald Coase, in his essay 'The Problem of Social Cost' (1960), which would help him obtain the Nobel Prize in Economics in 1991. Instead of a tax exercised by government, Coase proposed the introduction of property rights as a way of dealing with

negative externalities, in the conviction that market transactions would lead to the most 'optimum level of pollution'[27]**.** Coase's seminal idea was taken on by various subsequent economists who moved away from the notion of 'optimal levels of pollution' to call for government regulation in the establishment of pollution limits within which trade in permits could take place (Calel 2011:11).

The idea that environmental degradation could be countered with the introduction of property rights had also gained force after Hardin's renowned thesis on 'The Tragedy of the Commons' in 1968. Arguing that common property in a 'finite world' led to resource depletion (and confounding the concepts of common property and open access), Hardin postulated that the 'tragedy' of degradation could 'be averted by private property, or something formally like it' (Hardin 1968:1245). Interestingly, however, he noted that the problem of pollution posed slightly different challenges, since 'the air and waters surrounding us cannot readily be fenced', advocating in turn for 'coercive laws or taxing devices that make it cheaper for the polluter to treat his pollutants than to discharge them untreated' (Hardin 1968:1245).

Ideas on the establishment of property rights and pollution permits to deal with degradation found their way into policy through the 1977 Clean Air Act in the US, following the establishment of the US Environmental Protection Agency (EPA) under Nixon's mandate in 1970. An offset programme was brought into being which allowed firms to expand and build new producing plants in areas not subject to emissions regulations through trade in emission quotas. Over the coming decade, further mechanisms arose, allowing polluters to achieve compliance on emission levels through

27 Coase reframed the debate on the most appropriate ways of dealing with externalities by suggesting that social costs such as pollution were not unidirectional problems where A harmed B, but were rather reciprocal, since the regulations established to compensate B had also the potential to harm A.

similar offsetting practices (Solomon and Gorman 2002)[28]. Emissions trading began to be posed as the most cost-effective strategy to spur technology innovation for pollution control (Calel 2011) and gained momentum with the advent of Reagan's neoliberal policies, which advocated for flexibility in environmental regulation. In 1990 the Clean Air Acts Amendments were introduced by George H. W Bush, effectively establishing a national sulphur dioxide emissions market to deal with the environmental problem of acid rain (Solomon and Gorman 2002). Along with the already operative Wetland Mitigation Banking system (see Robertson 2000), these two early approaches lay the groundwork for the rise of a market in other environmental services, such as CO2. It was this last one that acquired an unprecedented global reach, as the key mechanism to deal with the biggest environmental problem the world had ever faced: climate change.

*The Kyoto Protocol and the 'flexibility mechanisms'*

The 1992 United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, marks the moment when the question of climate change became institutionalised at a global level. The United Nations Framework Convention on Climate Change (UNFCCC) was adopted at the conference with the stated aim of stabilising 'greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system' (UNFCCC 1992:4). Under this framework, emissions by the year 2000 should not exceed those of 1990, although these were not binding objectives.

Around the same time, various proposals were being put forward in favour of a global emissions trading system. In 1995, an IPCC report stated that 'for a global treaty, a tradable quota system is the only potentially cost-effective arrangement where an agreed level of emissions is attained with

28 'Netting', for example, allowed firms to forego the modification of equipment needed to meet newly set standards if they reduced emissions elsewhere at the same location, whereas 'banking' allowed polluters to retain 'offsets' or 'bubbles' for future use (Solomon and Gorman 2002).

certainty' (in Calel 2011:16). A greenhouse emissions trading system became a decisive leverage item in the run up negotiations to the adoption of the Kyoto Protocol in 1997 because the US, along with various other countries, refused to accept binding commitments to emission reductions unless such a mechanism was included. Although the European Union suggested in 1998 that no more than half of the emission targets be offset by carbon trading, by the time the Kyoto Protocol came into force in 2005 (and without the US commitment to any binding emission reductions), a European Union Emissions Trading System (EU-ETS) was in place, as well as three 'flexibility mechanisms' as part of the Protocol: International Emissions Trading (IET), the Clean Development Mechanism (CDM) and Joint Implementation (JI). Under these mechanisms, Annex I parties (industrialised countries and 'economies in transition')[29] could meet their reductions commitments through some form of carbon trading. Whereas the IET established the cap-and-trade system, where a cap on emissions is set and allowances are sold or given out to polluters who can then trade among them, the CDM and JI brought into being a new element: the project-based emissions reduction or 'offset'. In this case, industrialized countries could now meet their reductions commitments by carrying out projects that reduced emissions in either 'economies in transition' (as part of JI)[30] or in developing countries (as part of the CDM). Since the CDM spurred initial opposition among developing countries—seen as an easy way of reducing mitigation costs by industrialised countries—the idea that projects should include some form of 'sustainable development' was incorporated (Lecocq and Ambrosi 2007). The political economic relationships between

29 Annex I Parties are: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland,Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, and the United States of America.

30 Economies in Transition are: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Russian Federation, Slovakia, Slovenia and Ukraine.

industrialised and developing countries thus acquired a new vitality, and carbon dioxide took hold of the imagination of major 'development' actors.

In 1999, for example, the World Bank launched the Prototype Carbon Fund (PCF), bringing together 6 governments and 17 private companies in an $180million fund with the stated aim of 'pioneering the market for project-based greenhouse gas emission reductions while promoting sustainable development and offering a learning-by-doing opportunity to its stakeholders' (UNFCCC-CDM n.d.). The World Bank thus became the first investor in the CDM (Lecocq and Ambrosi 2007), and remains, to this day, a key player and advocate of the mechanism. By 2004, a year before the Kyoto Protocol came into force, the World Bank's carbon finance activities had expanded to various other funds, including the BioCarbon Fund, explicitly set up to deal with land-use and carbon sequestration projects. Among them would eventually be TAMS, one of its 'pilot projects' in Africa. It is also important to point out here the role that big environmental NGOs played in lobbying for the adoption of carbon trading in the Kyoto Protocol. Lohmann argues, for example, that the WWF 'joined the European Roundtable of Industrialists (UNCIE) and the US think-tank inspired Centre for European Policy studies in support of the EU Emission Trading Scheme' (2006:58). Around the same time, Conservation International (CI) launched its Center for Environmental leadership in Business (CELB) division in its stated effort to 'work with companies to minimise environmental impacts and to harness private sector ingenuity on behalf of healthy ecosystems and human well-being' (Conservation International n.d.).

The inclusion of forests in the mechanism was always a controversial issue, both due to carbon measurement uncertainties and because it opened the door to large-scale commercial plantations, a point some environmental NGOs denounced. It was therefore resolved that as part of Land Use, Land-Use Change and Forestry (LULUCF) projects only afforestation and reforestation activities would be included, with their total numbers capped

and with a restriction in place that did not allow importation of credits into the EU-ETS (Lecocq and Ambrosi 2007).

Although conservation projects were left out of the mechanism, they quickly began to thrive in the voluntary market[31] through Reduced Emissions from Deforestation and Degradation, or REDD[32]. The 13th session of the Conference of the Parties (COP) at Bali in 2007 was a turning point for this mechanism, where a roadmap was drawn up for its inclusion as part of the CDM (Bidaud 2012:138). With the view set on post-Kyoto agreement, the World Bank established the Forest Carbon Partnership Facility (FCPF) in 2007, bringing together governments, businesses, NGOs, and, in theory, Indigenous Peoples to deal specifically with this programme (The Forest Carbon Partnership Facility n.d.). Among the countries involved was Madagascar.

In September 2012, three days after the UNFCCC celebrated the issuance of the 1 billionth Certified Emission Reduction, a report by the High Level Panel for the CDM Policy Dialogue issued a call to action to reverse the 'collapse' of the CDM market (High Level Panel on the CDM Policy Dialogue 2012). An over-allocation of permits in the EU-ETS market and the global economic crisis that began in 2009 had resulted in a surplus of allowances, bringing down the price of a tonne of carbon from $20 in 2008 to $0.51 in 2013. In addition, 2013 saw an 88% decline in the numbers of projects submitted for validation compared to the previous year (World Bank 2014:39). Although various proposals have been made to revitalise the market, such as the inclusion of REDD or 'voluntary cancellation' where

31 The voluntary market is a non-compliance market where companies, individuals or other actors can 'offset' their emissions. It is regulated by different standards and regulations generally considered more flexible than those of the CDM.

32 REDD was initially known as RED, and emerged from lobbying activities by Brazilian NGOs in 2002 to bring attention to the problem of deforestation in the Amazon. The second D was added in 2007 to acknowledge the degradation problems faced by countries in the Congo basin, as different to deforestation in Latin America (Bidaud 2012:138). The initiative later became REDD+, and along with deforestation and forest degradation, today includes the conservation of forest carbon stocks, sustainable management of forest and enhancement of forest carbon stocks.

anyone could purchase CERs to offset their emissions (Michael n.d.), the future of the mechanism hangs in the air, and all eyes are on the next COP that will be held in December 2015 in Paris.

I have here presented a brief history of the development of carbon as part of carbon markets with a focus on the CDM. In the next section I turn to Madagascar, where I situate environmental management efforts within the country's political-economic history. As we will see, Madagascar today is not only a particular place due to its high levels of endemic flora and fauna, but also due to the environmental governance structure that is in place in the country and its weight in national politics. This is fundamental to understanding the country's involvement with carbon markets and the kind of project that TAMS was.

## A History of Environmental Management in Madagascar

### *From pre-colonial to colonial times*

Madagascar is the world's fourth largest island, located in the Indian Ocean and about 1000 km off the coast of Mozambique. It is usually portrayed as the result of a prehistoric split from the Indian peninsula, an argument also employed to explain the island's high levels of species endemism (over 80%). Human habitation has always been considered a bit of a mystery, although it is generally accepted that the first humans arrived from what is today Indonesia around 500AD, later followed by East African populations (recent archeological research by R Dewar et al. 2013, however, suggests evidence of occupational sites dating earlier than 2000BC). The island today is home to over 20 million people, who speak dialects of a common language, Malagasy, of Malayo-Polynesian origin. There are eighteen recognised ethnic groups in Madagascar, where the Merina—the group that inhabits the central plateau in and around the capital city of Antananarivo—make up most of the national elite, predominantly present in the administration and higher-level jobs.


**Figure 5. Map of ethnic groups in Madagascar. Source: Allen and Covell, 2005: xxvi**

Conservation efforts in Madagascar date back to the days of King Andrianampoinimerina in the late 18th century. Although various kingdoms had flourished in Madagascar during the 16th and 17th centuries, it was with

the Merina Kingdom that an island-wide unification took place for the first time (Allen and Covell 2005). The first bans on cutting firewood and burning the forest were established as a means to protect irrigated rice fields, as silting tended to happen on deforested hills due to torrential rains (Hufty and Muttenzer 2002). This effort was followed by successive legislation on the burning of forests through the 1881 Code of 305 Articles established by Prime Minister Rainilaiarivony, under the dictates of Queen Ranavalona II, Andrianampoinimerina's fifth successor (Kull 2004:207).

With the French annexation of the island under General Gallieni's rule in 1896, conservation efforts progressively intensified. Most of these were geared towards stopping slash-and-burn agriculture, although there was also a strong scientific concern over the colonial government's impact on the island's environment. Hufty and Muttenzer, citing Boitau, declare that 'on 12 million hectares of exploitable forests at the time of the conquest, a third was destroyed in the space of 50 years' (2002:4). This was mostly the result of infrastructural works—notably the railroad (as we will see in chapter four)—and agricultural expansion and intensification of cash crops (Jarosz 1996). As a counter-measure, reforestation with exotic species was introduced in the central plateau and eastern escarpment and the first network of protected areas was established in 1927, which was made up of ten integral natural reserves and two national parks for public access (Hufty and Muttenzer 2002; Kull 2004; Raik 2007). In any case, most of the colonial efforts in terms of conservation were directed at eradicating slash-and-burn agriculture, or *tavy,* in the expectation that local populations would be drawn into wage-labour (Jarosz 1996; Sodikoff 2004)—one of Madagascar's most coveted and scarce resources at the time (Feeley-Harnik 1991). In chapter four I further explore colonial conservation and economic policies for the area of Andasibe.

*Post-colonial Madagascar*

The end of the colonial era in 1960 was followed by a decade of close ties and alliances between the island and the *métropole* under President Tsiranana's rule during the First Republic (1960-72). Five other categories of conservation areas were introduced (national parks, special reserves, classified forests, deforestation zones and non-hunting reserves) along with a 'complete set of environmental legislation' (Kull 1996:54). Tsiranana's regime was also the host to the 1970 International Conference on the Conservation of Natural Resources, organised though the International Union on the Conservation of Nature, IUCN—a Swiss based organisation which had begun operating in the country in 1963 along with the World Wildlife Foundation, WWF. Kull (1996) describes the conference as a milestone in the island's environmental policy history, as it helped to bring conservation into the national centre-stage, establishing several conservation schemes and attracting important sources of funding.

As I will show in chapter four, the Second Republic, established in 1975 and preceded by the May Revolution of 1972, was a contradictory regime of strict environmental legislation in national centres and its inefficient implementation in the rural periphery. Various laws were passed aggravating the punishments for forest burning, but the general experience in rural Madagascar was that of a 'gradual withdrawal of the state' (Graeber 2007:22), seen as either unable or unwilling to carry out any type of enforcement due to the economic collapse of the island. In his vision of a self-sufficient, socialist country, President Didier Ratsiraka had broken away from French and Western ties and aligned with the Soviet Bloc. His series of mega-development projects based on foreign loan investment, however, rapidly sent the country into a spiral of debt (Gow 1997) sinking both the state's capacity to act beyond urban areas and the population's living standards. In 1980, Ratsiraka opened up the country to Western powers once again, making of Madagascar the first African socialist country to enter into a Structural Adjustment Programme (SAP) with the International

Monetary Fund (IMF). This moment is also generally considered to mark the beginning of the country's current environmental governance structure, as it was then that Madagascar resumed its environmental policies within the new framework established by international institutions. It is no coincidence that the same year that Ratsiraka accepted the SAP, the WWF established its first offices in Antananarivo (Kull 1996). With images of degradation circulating in global media as Western researchers were readmitted into the country (and with deforestation peaking as a result of the decline in the country's economic conditions (Pollini 2007:58)) Madagascar emerged towards the end of the twentieth century as an island in need of urgent environmental intervention.

In order to understand the kind of place that Madagascar became at the turn of the century, and the clusters of power and governance that formed around its prestigious and endangered landscapes, we need to turn to wider events, and, specifically, to US politics.

Over the previous decade, the environmental movement that had sprung up among civil society in the US during the 1960s had been institutionalised into US policy and global organisations. In 1972, the Club of Rome published the study 'Limits to Growth', in which they projected an unsustainable future for life on earth if current trends of resource use and population growth continued. Similarly, toward the end of the 1970s a group of environmental NGOs pushed the US Congress to authorise the United States Agency for International Development, USAID, to carry out environmental protection programmes as part of foreign aid (Corson 2010). With the perceived failure of state-centric development, and a call to direct funding through the private sector from the Reagan administration, NGOs rose to prominence in the implementation of USAID's environmental programmes. This was also enhanced by a definition of biodiversity conservation as exclusively a 'foreign concern' (Corson 2010:594) and which helped appease civil society's calls for environmental action while avoiding clashes with domestic political and economic debates. Thus, a

particular group of NGOs began to be entwined with USAID's biodiversity funding, an alliance that would only grow stronger in the coming decades (and which has now also been joined by corporations)[33]. The convergence between USAID and environmental NGOs in the US is of particular importance here because, as we will see, along with the World Bank, they have formed key alliances in the environmental governance of Madagascar, including TAMS.

In this global arena, and with the institutionalisation of sustainable development in 1987 through the Brundlant Report (entitled *Our Common Future*), Madagascar became an object of prestige for environmental NGOS and donors—a status it still retains (Duffy 2006). In 1984, the Malagasy Government adopted the 'National Strategy for Conservation and Development', precipitating various conservation programmes funded by the World Bank, bilateral donors (the US and Switzerland), the WWF, and UNESCO and geared towards 'soil conservation, forest management and biodiversity conservation' (Pollini 2007:59). These efforts culminated with the drafting of the National Environmental Action Plan (NEAP) in 1988 with financial and technical support from 'the World Bank, USAID, the Swiss aid, UNDP, UNESCO and WWF' (Pollini 2007:60). This was also the year when Meyers included Madagascar in the list of the ten 'hotspots' in the world, described as conservation priorities due to exceptionally high levels of endemism and unusually rapid rates of deforestation (Myers 1988).

*The National Environmental Plans (I to III)*

The NEAP had two primary goals: a significant increase in the number of protected areas and the inclusion of populations in conservation programmes as part of 'sustainable development'. The programme was

33 This Washington-established relationship has led to what Corson terms 'conservation enterprises' where capital moves between 'public, private and non-profit entities in the name of conservation, without ever being used 'on-the-ground'' (2010:580).

divided into three phases, and was expected to last from 15 to 20 years with a total funding of $300 to $400 million (Bidaud 2012:68).

The programme's first phase (EP1 1991-1995) was dedicated to building the institutional framework that would make it operational. From the $187 million it received (5 to 10% of the country's annual budget) 60% went into biodiversity or forestry programmes. We can see here the influence of USAID's biodiversity conservation programme presented above, which, as the major donor to the NEAP, justified its expenditure before the US Congress on the basis that 'Madagascar is Africa's most important biodiversity priority, and among the world's top five for species diversity and uniqueness' (Hufty and Muttenzer 2002:5). Under the Directorate of the Ministry of the Environment, three new offices were set up: the '*Office National de l'Environnement*' (ONE) as coordinating entity, the '*Association Nationale d'Actions Environnementales*', ANAE, in charge of conservation and development programmes, and, the '*Association Nationale pour la Gestion des Aires Protégées*', (ANGAP now Madagascar National Parks, MNP) a public-private conglomerate that runs the country's protected area network. It is worth detailing how ANGAP and ANAE are run, since both organisations took part in TAMS (ANAE was appointed TAMS project manager in 2008) and both are exemplary of the particularities of Madagascar's environmental governance structure.

As a 'private organisation that runs a public utility', ANGAP (or MNP) has among its members the three biggest environmental NGOs that operate in the country—WWF, WCS, CI—acting as both financial and technical partners. USAID and the WB provide funding, along with the German Development Agency (GTZ), the German Development Bank KFW and the EU. ANAE, on the other hand, receives Swiss and other NGO funding (Bidaud 2012:70), and although it is intricately connected to the Ministry, it poses as a non-state organism as a means of appeasing donors' concerns over state corruption. We can therefore begin to see how both ANAE and ANGAP

respond to the WB's and USAID's policy of diverting environmental governance away from the state and into public/private partnerships.

As part of its efforts to include local populations in programmes of sustainable development, the EP1 embarked on the 'Integrated Conservation and Development Programme' (ICDP) approach which had been formulated by the WWF in 1985 (Hufty and Muttenzer 2002). Aiming to depart from inefficient and expensive experiences of 'fortress conservation' (where whole populations are excluded and displaced from conservation areas), this model proposed the integration of local people into conservation activities. This was to be done through the provision of employment in eco-tourism and small, rural development projects, as well as through the establishment of buffer zones around strict protected areas where certain resource uses were allowed (see Gezon 2006; Harper 2002; Sodikoff 2012a for ethnographies of ICDP projects). The 'development' part of ICDP approaches, however, always remained ancillary to conservation (Hufty and Muttenzer 2002:6) and was, in any case, insufficient to sustain more than a few families within whole villages.

The beginning of the NEAP's second phase, EP2 (1997-2003), coincided with political turmoil at a national level, where Ratsiraka was first ousted and replaced by Albert Zafy in 1993 as President of the Third Republic, and then elected back into office in 1996, just before the EP2 was launched. This second phase focused on the process of decentralisation and regionalisation, in an effort to correct the deficiencies of the ICDP and as a continuation and deepening of economic liberalisation policies. A renewed effort to bring conservation and development together was synthesised in the 1996 GELOSE law (Gestion Locale Sécurisé), which proposed the creation of contractual agreements between local populations and the state in order to define local rules of use and access (and where NGOs would act as mediators in negotiations). As Hufty and Muttenzer argue, this shift in approach owes its legacy to 'a new philosophy of foreign aid' that was developing internationally and which was based on a 're-discovery of the

traditional' and on a turn to decentralisation through the notion of 'community forestry' (2002:6). Although the programme has succeeded in setting a significant number of contracts in place, its efficacy remains under debate (Kull 2002).

Political turmoil ensued once again in 2002, and ended with the exile of Ratsiraka and the arrival of President Marc Ravalomanana. Ravalomanana is usually cited as the environmental president par excellence: at the 2003 World Parks Congress in South Africa he pledged to triple the number of protected areas in the island and create a '6-million-hectare network of terrestrial and marine reserves' (Duffy 2006:741). This episode is representative of Ravalomanana's manoeuvre to break ties with France and ally with the US and South Africa. It has been suggested, in fact, that his pledge to triple the country's protected areas was largely the result of pressure by Conservation International and the WWF, who played a powerful card with Ravalomanana as key players in Washington-based environmental policy (Duffy 2006:742).

Whatever the reason, the beginning of the EP3, which was launched in 2004, was marked by strong government support to conservation initiatives along with a revitalised commitment to liberalisation policies, of which Ravalomanana became a fervent advocate (foreign direct investment is reported to have risen from $86 million in 2005 to $1.47 billion in 2008 (Dewar et al. 2013)). In terms of conservation, the third phase of the NEAP saw three distinct developments which set it apart from earlier initiatives: a resurgence of scientific discourses calling for exclusionary practices at the expense of development activities (Bidaud 2012; Duffy 2006:743); an 'eco-regional' perspective largely based on increasing the extent of protected areas to form large biodiversity corridors (Ferguson 2009:133); and the rise of Payments for Ecosystem Services (PES), with carbon at the forefront and which has marked the country's environmental policy this past decade.

Among PES projects, which contemplate watersheds or biodiversity, Bidaud argues that forest carbon projects have been 'the most visible, the

best financed and the earliest in their implementation in Madagascar' (2012:121). TAMS was the only project that aimed to attain CDM status, but it was often presented as being part of the larger 'Ankeniheny-Zahamena Biodiversity Corridor', CAZ. This 425,000 hectare initiative managed by CI has been posed as one of the major REDD projects in the country and as an international example of REDD methodology by the World Bank (Bidaud 2012:140). Another flagship carbon project is the Makira Forest REDD+ Project in north-east Madagascar, managed by the Wildlife Conservation Society (WCS), and which in 2013 became the first ever African project to put 'Government-backed' and 'verified' offsets for sale in the open market, with 32 million tons of carbon predicted to be stored in the forest over thirty years, and 700,000 carbon credits thus produced (WCS 2013).

In 2009, and after deadly protests in the capital city of Antananarivo, Ravalomanana was exiled to South Africa. His demise is usually associated to a deal he was supposedly negotiating with South-Korean company Daewoo to lease half of the country's arable land. Andry Rajoelina—a young DJ from Antananarivo—took over the Government, inaugurating what would become a five-year transitional period which saw the living standards of the population decline at an alarming pace. In the wake of what was internationally deemed a *coup d'état* major donors withdrew all but humanitarian aid, and no follow-ups to the NEAP nor to its funds were established. During my last stage of fieldwork in 2013, and with the political crisis still unsolved, a new batch of funding was released nonetheless. It was dedicated exclusively to the operation of the last stage of the EP3 in relation to REDD, Reduced Emissions from Deforestation and Degradation. This, however, was not to be given directly to the (non-recognised) government, but rather channelled through NGOs (Bidaud 2012:83). The transitional government has in fact been widely accused of allowing the most recent episode of forest destruction, benefitting from illegal rosewood extraction by Malagasy and Chinese merchants.

On December 2013 elections were finally held, putting an end to the transitional period. A remarkable event, signifying the particularities of environmental management in the country, was CI's endorsement of the newly elected President, Hery Rajaonarimampianina. CI's President Russ Mittermeier described him as 'a promising new leader' (Mittermeier 2014) after meeting him only a month after he had taken office, due to his determination to put an end to the rosewood trade and commit to conservation efforts.

We can thus begin to see here some of the particularities of Madagascar's historical and contemporary forms of environmental management, marked by a prominent and powerful presence of international donors and NGOs. Duffy has referred to Madagascar's specific situation as an instance of the 'governance state' (Harrison 2004), arguing that, over the last two decades, 'global networks of governance have become indivisible from nation states' and a shift in the location of authority has taken place, leading to a 're-defined sovereignty' (Duffy 2006:734).

As we have seen, this translates into powerful networks of transnational actors that determine national policy, and where the government intervenes as one more actor, and 'not necessarily the most important one' (Duffy 2006:736). A case in point analysed by Duffy is 'The Donor Consortium', which developed along with the NEAP and the Malagasy Charter for the Environment in the early 90s. The Consortium is led by the World Bank and involves USAID, German, Japanese and Swiss governments and the WWF, WCS, and CI. As Duffy argues, the Consortium's particularity lies in the power of environmental NGOs who do not only contribute to environmental policy but also direct 'all forms of national policy-making in Madagascar' (Duffy 2006:741). Ravalomanana's decision to announce the tripling of the country's protected areas is but one example of the influence of NGOs within the Consortium and national policy. Much of this power is not just forged in Madagascar, but actually comes from the US political

context, where NGOs have developed a strong lobbying capacity over USAID and the World Bank.

Importantly, however, Duffy reminds us that the circulation of power through these networks is neither unidirectional nor 'monolithic', where the state becomes subject to a powerful and coherent set of external actors that dictate policy unanimously. Within such networks, power plays, contingency and clashes occur between different donors, and the state (as we will see for the case of TAMS) still gets to have a say. Rather, Duffy argues that 'global environmental governance might be thought of more fruitfully as a system of practices and regulations that are still emergent and incomplete' (2006:743). I will return to this notion of emergence and incompleteness at the end, when I introduce the concept of 'assemblage' as a productive way of thinking about TAMS as forest carbon project. It is to its history that I now turn.

## TAMS, or the complicated project of Andasibe

### *Andasibe*

Andasibe refers both to the municipality (*Commune Rurale*) and its administrative centre (the town of Andasibe) that is located 120 km east of Antananarivo, on the National Route 2 (RN2). It forms part of the region of Alaotra-Mangoro, and within it, the district of Moramanga—which also marks the district capital, only 20 km away from Andasibe.

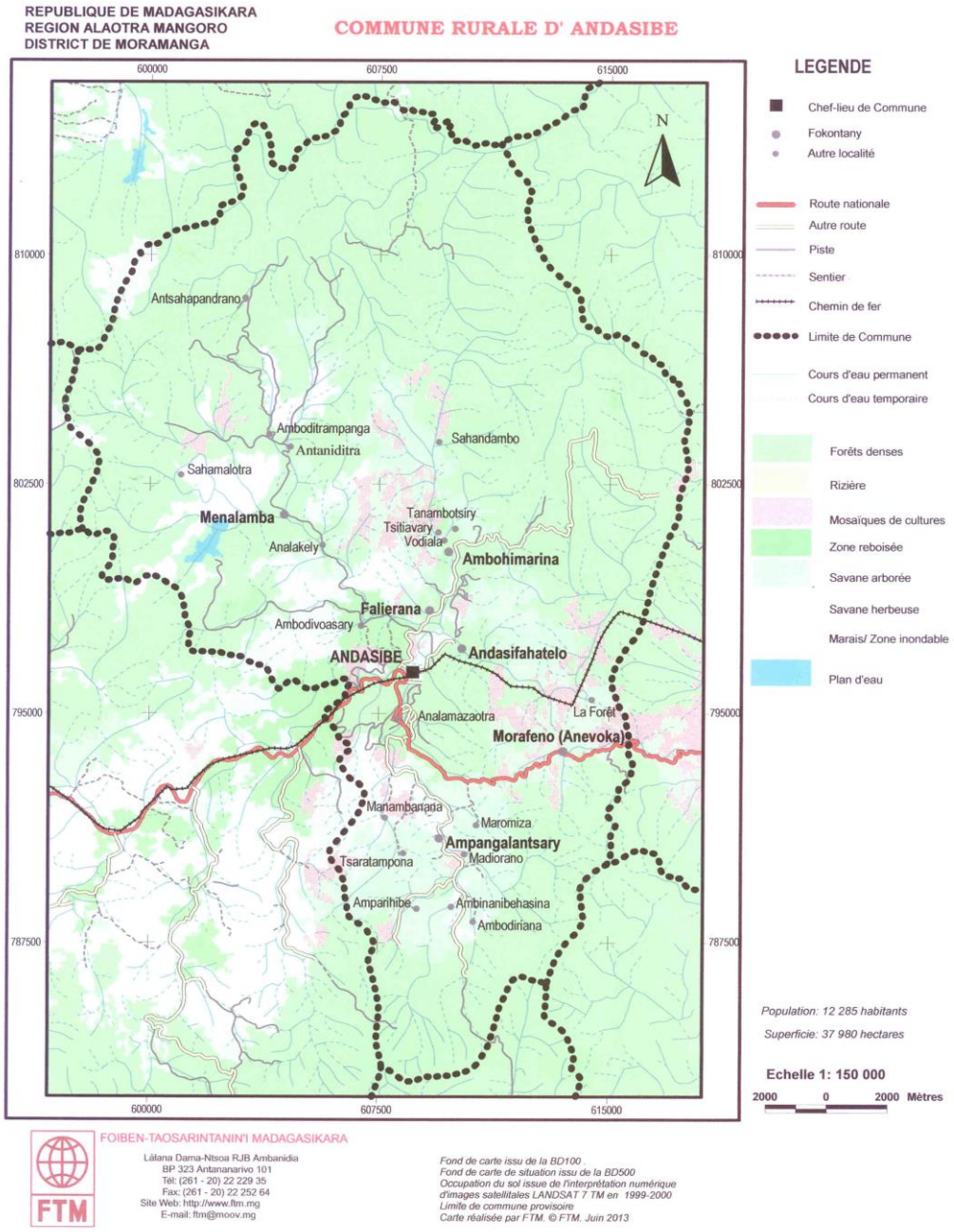


**Figure 6. The Municipality of Andasibe. Source: Madagascar's Geographical Institute, FTM (*Foiben-taosarintanin'i Madagasikara*)**

The municipality is made up of six '*fokontany*' (Andasibe, Falierana, Andasifahatelo, Ampangalantsary, Morafeno and Menalamba) the smallest administrative units in Madagascar. In 2007, it had around 12500 inhabitants, with almost half of them residing in and around the town of

Andasibe[34]. Out of these, 70% were Betsimisaraka, 20% Merina and 15% Bezanozano. As is often the case in rural Madagascar, local elites are formed mostly by Merina, Chinese or Indian families, who own or dominate most of the local trade. Andasibe's Mayor during my stay there was Mr. Abdoul Kader, a man of Indian and Malagasy origin, whose family was one of the most powerful in town.

Although Andasibe's lush forested landscapes dominate the area's contemporary conservation-based economy, their role in past industrial activities tends to be forgotten. In later chapters I will explore the area's history as key logging site for the early development of the colony (chapter four), and as an important enclave for the production of graphite, which began around the 1930s (chapter six). Although the graphite mines closed over a decade ago, Andasibe is less than 20 kilometres away from the contemporary mine of Ambatovy, which began its nickel and cobalt mining operations in 2012 and is one of the largest of its kind in the world. The site is run by Canadian conglomerate Sherritt International, who built a 250 km long pipeline that goes from the point of extraction to the eastern port of Toamasina. The mine provided (temporary) employment opportunities for local populations during building, although it also had to relocate some families as a result of the pipeline. While its operations have been surrounded by controversy over permits and environmental and social impact reports, the mine has often partnered with conservation initiatives in the area (such as the National Park or the CAZ), and in 2013 began the development of its own biodiversity corridor 'Corridor Forestier Analamay-Mantadia' (CFAM).

Although Ambatovy plays no small part in Andasibe's local economy, the area is economically fuelled by eco-tourism (for both national and international tourists) thanks to its renowned protected areas. Its biggest attraction is the Andasibe-Mantadia National Park (AMNP), which covers a

34 Andasibe 57901, Falierana 1432, Andasifahatelo 1403, Ampangalantsary 1501, Morafeno 1159, Menalamba 1198.

total of about 16000 hectares divided between the small *Réserve Spéciale Analamazaotra* in the town of Andasibe (810 ha), and the much bigger Mantadia area. Adjacent to the AMNP there is also the Forest Station (*Station Forestier*, 700 ha), run by the local organisation 'Association Mitsinjo', who also manages the nearby marsh of Torotorofotsy. Mitsinjo was established in 1991 by German biologist Rainer Dolch in partnership with local people, and played an important role in TAMS, as I explain below. Andasibe's most iconic elements are the indri (*Indri indri*)—the biggest lemur in Madagascar—and the orchids that flourish in its humid climate. The area's flora and fauna do not just attract tourists, but also draw in a large number of national and international environmental researchers.

The local economy is therefore dominated by the conservation industry. There are two four-star hotels in the area and a series of other hotels, bungalows and hostels in town and in the environs of the entrance to the National Park. The tourist guide industry booms during the high season, attracting many guides from the capital city who wait at the Park entrance to offer their services (a guide is required in order to visit the site). Here, the knowledge of languages is essential, and the industry is therefore structured around ethnic and class divisions: those with easier access to education and language learning (usually Merina or from the capital) have a better chance of attracting customers than locals do. The AMNP reproduces this labour division, with Merina occupying the best administrative positions, and local Betsimisaraka employed as manual labour (further explored in chapter five, see also Sodikoff 2012). As one goes further inland, in turn, to villages like Mahatsara, the chances of making a living out of conservation decline drastically.

It was in this environment, as the area's eco-tourist activity took off during the late 1980s with the opening of the AMNP, that TAMS began to take shape.

*TAMS, Tetik'asa Mampody Savoka*

Considering how complex and extensive the network of organisations involved in TAMS is, it is particularly surprising that the origins of TAMS go back to the vision and efforts of a single individual with no organisational affiliations. Louise Holloway, an independent environmental researcher from the UK with a background in environmental studies, arrived in Madagascar in 1990 for an expedition studying the sunset moth (*Chrysiridia rhipheus*), a day-flying lepidopteron endemic to Madagascar whose colourful appearance had made it famous worldwide. The expedition took her to 13 protected areas and surroundings, among which was the Andasibe-Mantadia National Park (AMNP), which had just been inaugurated the year before. As she climbed the locally famous rock of Andriandavibe, she heard the calls of the indri, and realised they were coming from small forest fragments from which the lemurs could not get out. Aware that these fragments were partly the result of *tavy*, Holloway also met with local farmers. It emerged that they were migrants coming from areas where the land had become too degraded for cultivation due to over-intensive farming, and who were in search of new arable land. This pattern seemed recurrent in the area and was aggravated, in Holloway's view, by the lack of land tenure security. Both people's agricultural futures and biodiversity seemed to be at risk.

Over the coming years her research focused on rainforest regeneration dynamics in Madagascar, which seemed to differ from forests elsewhere in that regeneration did not occur naturally. Two factors emerged as key causes: the fact that seeds were not being dispersed because lemurs, being arboreal primates, would not leave the forest patches they inhabited; and that the destruction of micro fungi through burning led to conditions that favoured invasive plants instead of forest vegetation. Part of the approach she devised involved the rehabilitation of degraded land in order to create forest corridors through which lemurs could move about and disperse seeds, while other ideas focused on securing land tenure for farmers and developing sustainable agricultural systems that would allow for a faster

regeneration of the fallows, thus curtailing the need for farmers to expand into the forest. The creation of forest corridors to catalyse the spread of plant and animal genetic material, and agricultural techniques to favour an improved and 'settled' form of *tavy* would become the main tenets of the project in its earlier stages.

Holloway was, of course, not the only person interested in protecting the forests of Andasibe. In 1995, she was contacted by a foreign researcher who was at that time working in the area and had heard about her ideas for establishing forest corridors. She insisted on the necessity of her project, alarmed as she was by the state of the lemurs in the area, and the first feasibility study for the project was carried out, bringing together key organisations which already operated in the area in a more or less independent way. Thus, the National Park authority ANGAP joined in along with SAF-FJKM who were in turn, at the time, collaborating with the US organisation 'Volunteers in Technical Assistance', VITA, in the management of the Analamazaotra forest area. Association Mitsinjo and Man and the Environment (MATE)—another organisation with German origins—also joined the initiative.

As the project gathered momentum, with an increasing number of local actors interested in becoming involved, a decision was made to hold a public meeting in Andasibe to develop a project vision. Along with local associations and NGOs, the state administrative structure was present through the Mayor and representatives of the Ministry of Water and Forests. Holloway recalls the meeting as a turning point for what would later on become TAMS. The first seeds of TAMS had thus been planted.

As TAMS began to grow in scope and actors, Holloway, who had been self-funded until then, began to look for ways of funding the initiative, a necessity that was born of the magnitude of the project. It was then that the first contact with carbon markets took place. Rainer Dolch, from Mitsinjo, recalls how Holloway had been looking for funding for a long time, but with

no success, and how they saw the carbon market as an opportunity to fund TAMS:

> 'Louise had always tried to find funding for such a project, and unfortunately never succeeded, so only in the late 90s, and early 2000s, well, everybody embarked on carbon sequestration projects, which came into fashion around then, and Louise and I thought that well, carbon sequestration could actually be a tool for funding this project. So, our focus was never on carbon sequestration per se, but it was rather using carbon sequestration as a tool for restoring rainforest'

During 1998-99, Holloway was close to making a deal with the Carbon Storage Trust, a UK based carbon offset company founded in 1997 which later became Climate Care in 2003, and was sold to J.P.Morgan in 2008. The deal, which would have seen TAMS partner with Land Rover did not materialise due to the delays and difficulties that the voluntary carbon market had run into at a global level.

It would not be until 2002 that TAMS secured some funding as it was taken over by Conservation International through their CELB (Centre for Environmental Leadership in Business) division. Although CI had been working in the country since 1990, their approach had not contemplated actual reforestation, but had rather focused on protecting the remaining forest. Holloway speculates that their interest in TAMS and change of direction may have come through some directive from CI in Washington. It is important to remember that this happened a mere three years before the Kyoto protocol came into force in 2005, which would set carbon trading in place globally. Through CI's involvement and project takeover, negotiations began with World Bank's BioCarbon Fund to turn TAMS into a pilot CDM project. It was at this stage, Holloway claims, that 'everything started to change. What had been bottom-up, it had grown from the ground, it started

to become organised at the international and national level'. TAMS had turned into a forest carbon project.

The framing of TAMS as a pilot CDM project saw the inclusion of a wide array of actors at every scale. Its most important addition was the Government of Madagascar through the Ministry of Environments and Forests, MEF. A coordination unit was created at the ministry level, '*Unité de Coordination des Fonds Biocarbone*', UCFBC, with two representatives from the General Office of Forests, and two from the General Office of Environment (I explore in detail the intricacies of the government's involvement in the project in chapter seven). In 2008, ANAE were appointed project managers after a public tender. This was also the year in which TAMS became consolidated as a CDM carbon project, as it was then that the BioCF and Government of Madagascar signed the Emission Reductions Purchasing Agreement (ERPA)—the contract stipulating the carbon transaction. Conservation International, who had coordinated and funded the project's initial stages, retreated then to a 'technical partner' position, its role and influence, however, remaining pivotal, as we will see. At a regional level the project also involved CIREF, the regional forestry service, as well as other national institutions in a more ancillary way.

Reforestation was carried out by seven organisations that operated in the area of Andasibe and were supervised by ANAE. Although some of them were of a strong local character—like the *Association des Guides d'Andasibe*, AGA or *Association Mitsinjo*—others were the regional branches of national actors, such as SAF-FJKM or the Andasibe Mantadia National Park (AMNP). These organisations came to be known in TAMS' organisational structure as FAs—Facilitating Agents—who, in turn, hired local populations to carry out reforestation activities. At this point, the project's organisational structure was represented in the following way:

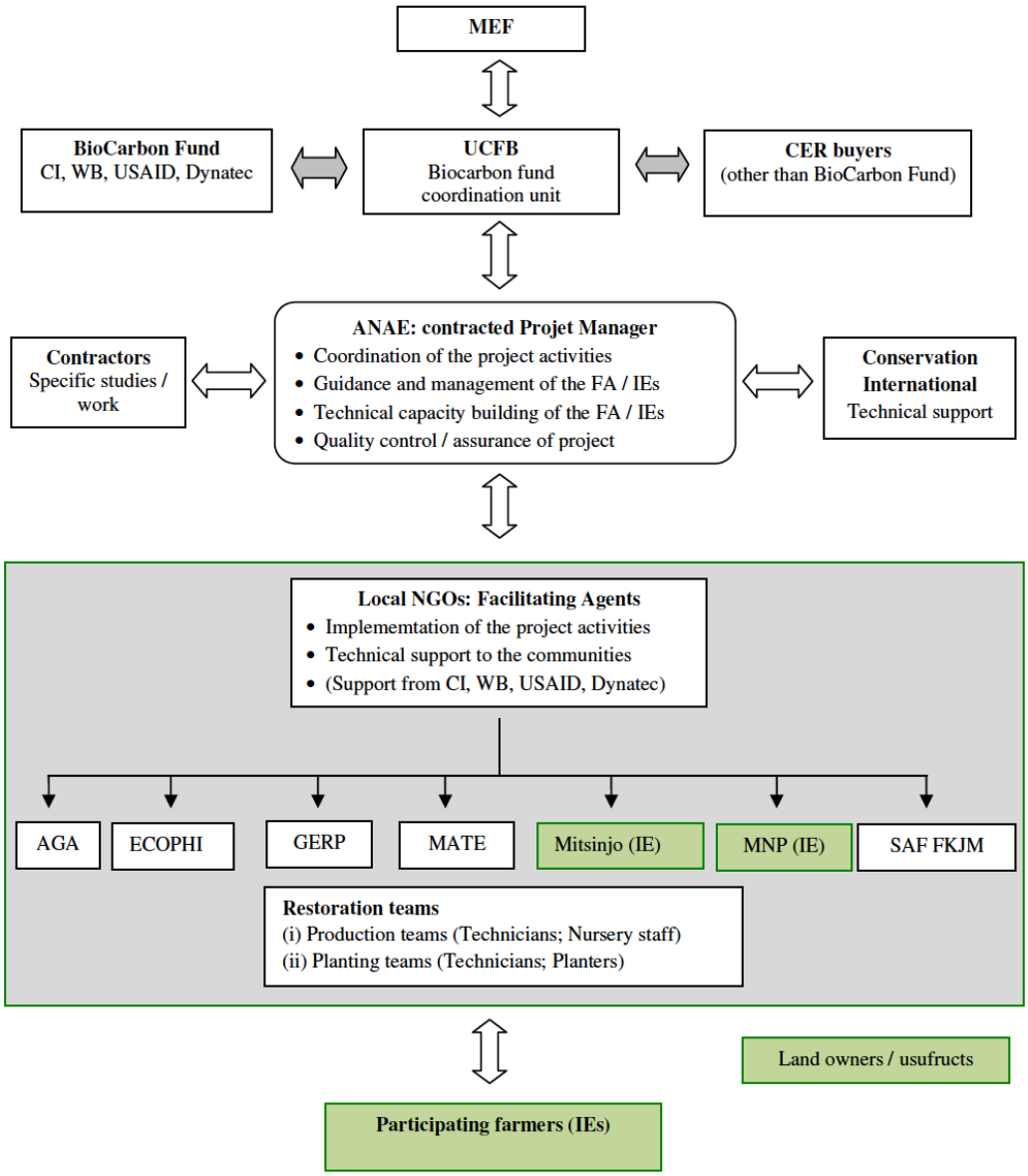


**Figure 7. TAMS organisational structure. Source: Ankeniheny-Zahamena-Mantadia Biodiversity Conservation Corridor and Restoration Project (Reforestation Component), Project Design Document (PDD), p.62**

Part of the reforestation was done on the land managed by the FAs, or inside the National Park itself, and another part was carried out in land provided by individual farmers in exchange for carbon revenue and work (see chapter six). Although the project initially envisaged the reforestation of 3000 hectares, funding and CDM regulation complications only allowed

for 1000 hectares to be planted—and of those not all of them turned out to be CDM eligible. A small amount of funding for the project came from the World Bank's BioCarbon Fund, although most of it was channelled through the funding dedicated to the third phase of the NEAP (EP3), which came to an end in 2011 and never resumed. A year later, the BioCarbon Fund cancelled the ERPA. TAMS was over.

There are many reasons that partly account for the failure of TAMS. From the BioCF's perspective, it was the government's impasse on the establishment of a benefit-sharing agreement with local communities that hindered the project, but obstacles abounded in what became known as 'the complicated project of Andasibe': unclear land tenure; a lack of a legal framework to establish the property status of carbon; government duplicities that vied with each other for donors' funding; trees that refused to grow or grew too fast; a complex and expensive CDM verification process; and more. Although I explore the project's perceived 'complexity' in chapter 7, it is essential to bear in mind that this dissertation does not aim to provide reasons for the demise of TAMS.

## Conclusion

In this chapter I have presented a social and historical account of 'carbon' through three histories: the development of carbon markets as a part of climate change mitigation; the historical trajectory of Madagascar's environmental governance; and the emergence of TAMS and its transformation into a forest carbon project.

We first saw how carbon dioxide emerged as a key indicator of anthropogenic environmental degradation, and how it transformed into a socio-technical and economic object as part of a more general move to deal with the negative effects of industrialisation through market-based approaches. Carbon trading was taken up as the most efficient and cost-effective way of dealing with climate change, and through its inclusion in the

Kyoto Protocol (and the parallel development of 'voluntary markets') a new relationship was forged between industrialised and developing countries on the basis of carbon 'offsets'. Forests figured prominently here as sites where offsets could be generated, and Madagascar emerged at the turn of the century as a key site for forest carbon projects. This was not simply a result of the island's unique environmental attributes: we have seen how Madagascar's renowned status as environmental hotspot is partly the result of the country's political and economic contexts in relation to global historical trajectories. These, in turn, have translated into very specific arrangements of power and forms of governance, where the country's biodiversity fuels an equally diverse 'eco-system' of national actors, transnational NGOs and international donors and institutions.

TAMS could be explained as the result of the interaction between these two histories: the development of global carbon markets as part of climate change mitigation and their targeting of Madagascar as global environmental hotspot. As such, it may be seen through the lens of 'neoliberal conservation' as described by Büscher et al. 'as a particular set of governmentalities that seeks to extend and police profitable commodification processes' (2012:23). But the history of TAMS presented in the last section of this chapter complicates this narrative, as it shows that the trajectory of the project is much more messy and much less linear: TAMS was not the planned result of a single attempt by a given set of global actors to commodify the forests of Andasibe. It rather emerged through the efforts of a single individual and grew progressively at the local level, until it reached out to carbon markets as a way of funding the project. It was at this stage that TAMS transformed into a forest carbon project and, as Holloway explained, 'everything began to change' with the incorporation of CI, the BioCF and the Government of Madagascar. But even at this stage TAMS remained a highly 'emergent and incomplete' (2006:743) initiative, just as Duffy has argued global environmental governance should be seen—proof of which is that TAMS, in any case, never produced any carbon offsets after all.

This is not to say that TAMS as forest carbon project did not attend to a set of specific neoliberal rationalities and techniques for governing forests through carbon markets, but it does point to its 'living, contingent and located' (Hayden 2003:84) character. How may we think then about (and with) TAMS, if we are to depart from a single and coherent view of the 'global' encroaching on the 'local' with an already established master plan? In this last section, I propose the concept of 'assemblage' as a productive way of understanding TAMS.

*TAMS as assemblage*

The concept of 'assemblage' has recently acquired a notable prominence in the social sciences. Marcus and Saka (2006) locate its ascendance in its capacity to evoke the 'ephemeral, the emergent, the evanescent, the decentered and the heterogeneous' (2006:101) without having to reject, at the same time, a certain condition of structure. As a 'conceptual resource', with origins in Deleuze and Guattari (1987), later explored by Manuel de Landa (2002) and borrowed by Paul Rabinow (2003), assemblage has been taken on as an apt element to avoid the rigidity of 'final or stable states' (Marcus and Saka 2006:106)[35]. In a similar way, Ong and Collier talk of the assemblage 'as the product of multiple determinations that are not reducible to a single logic' (2005:12).

In her critical re-reading of Scott's 'Seeing Like a State', Li (2005) offers an interesting view of the concept of assemblage in relation to 'improvement schemes'. Her aim is to 'move beyond' the binary categories of state and non-state spaces, and associated forms of power and resistance, that Scott employs to explain high-modernist projects. She therefore challenges the 'spatial optic' of an 'up there' all-seeing state, or power, operating 'unproblematically across national terrain, colonizing non-state spaces and

35 Rabinow (2003), for example, situates the assemblage between Foucault's 'more conceptually stable states of 'problematization' and 'apparatus' (Marcus and Saka 2006:104).

their unruly inhabitants' (2005:384). Rather, Li brings attention to the array of social actors which have been active in the production of 'improvement schemes', arguing for a vision in which such initiatives do not originate 'fully formed from a single source', but rather come about as an 'assemblage of objectives, knowledges, techniques and practices of diverse provenance' (2005:386). Her use of Nicholas Rose's term of 'contingent lash-up' (Rose 1999:276 in; Li 2005:386) to qualify the lack of coherence that improvement schemes have in their beginnings and to reject a single 'state vision' or 'master plan' (Li 2005:386) offers a productive way of thinking about TAMS' beginnings and its relation to processes of nature commodification and neoliberal conservation.

From the perspective of the assemblage, then, the development of TAMS as forest carbon project can be seen as a conglomerate of different elements and fragments which, like other 'programmes and technologies of government…may have a rationality, but this is not one of coherence of origin or singular essence' (Rose 1999:276). In a sense, TAMS may be apprehended through Foucault's (1977) description of the French legal system, as one 'full of parts that come from elsewhere, strange couplings, chance relations, cogs and levers that aren't connected, that don't work, yet somehow produce judgements, prisoners, sanctions and much more' (Rose 1999:276).

Through the 'three histories' presented in this chapter we have seen some of the key 'parts' and 'chance relations' that led to the emergence of TAMS as forest carbon project in the forests of Andasibe. In the following chapters I turn to carbon's multiple social lives as it was put to work in these landscapes, in order to explore what these 'strange couplings' produced.

# Part I: Introduction to Chapters Three and Four

A recent short documentary by the BBC World News' Africa Business Report (BBC n.d.) presents Madagascar's forests as sites that could generate from 50 to 60 million dollars in carbon credits within the next five years (up to 2020). As the video shows a burning hill in the forest of Analamazaotra in Andasibe, reporter Jason Boswell tells us that,

> 'Over the last half century, huge swathes of Madagascar's unique forests have been lost to slash-and-burn farming and urbanisation, but the government is now working to develop a number of projects in the country which could transform this sea of green into a different type of resource: one, which would not only protect the country's dwindling forests, but could in turn bring in profits from the sale of carbon credits'.

The story then goes on to present this multi-million dollar 'potential revenue' as an opportunity for both the government and the communities that live in and around the forests.

As exemplified in this short video, forests in developing countries are being re-conceptualised as repositories of a new source of value—the carbon credit—with enormous potential. By turning a source of emissions into a carbon sink, forest carbon projects aim to actualise this value and provide economic, environmental and social benefits.

What kind of value do carbon credits propose in forest landscapes and how is it to be rendered visible, measured and distributed? What kind of material and discursive elements are mobilised to bring it about and how does it articulate with perceived forms of waste? If, in turn, value is a 'relational concept' and 'must always be thought of as "value for whom?"' (Ferry 2011:925), what other forms of locating and understanding value are negated or obscured through carbon credits?

These are some of the questions that I pose in the next two chapters, as I interrogate the nature and effects of this specific form, or social life, of carbon— the carbon credit or Certified Emission Reduction (CER)—as it is put to work in the landscapes of Andasibe.

As we will see, the transformation of perceived waste into a source of value was TAMS' most fundamental objective as a forest carbon project, as it aimed to turn present or future waste (degraded fallows from *tavy*) into a source of value (the carbon credit through the carbon sink). It was only through halting *tavy* and transforming what were perceived as actual and potentially degraded landscapes into forested ones, or what is the same, through an intervention in a teleology of degradation, that actual 'reductions' could take place and hence value could be generated. The transformation of waste must therefore be seen as the most fundamental element of a forest carbon economy: credits or CERs originate exclusively by transforming perceived waste into value. Value and waste—and their relation to forests and *tavy*—are therefore the key organising principles that I employ in the next two chapters to explore this particular social life of 'carbon'. I do it, however, through various perspectives.

Rather than taking waste solely as the semantic counterpart of value, as it has sometimes been portrayed (Thompson 1979), my aim is to show the complicated and productive interplay between these two concepts, which are often far from clear-cut. Thus, in chapter three, we will see how ambiguity and liminality are defining features of degraded fallows as waste. In chapter four, in turn, the straightforward division between forests and *tavy*, as value and waste, will be complicated, as I focus on the way these two concepts are mobilised and entangled to generate carbon value. Therefore, far from treating 'loss, waste and the unproductive' as 'anti-economic' (as strucuralist positions have sometimes represented waste, see Hawkins and Muecke 2003:xii), I will explore how waste mediates processes of value production as part of forest carbon projects, as I open the black box of the carbon credit, or CER, and dig into what I term its 'constitutive elements'.

As we saw in the previous chapter, TAMS was not 'born' as a carbon project, but progressively became one. The project's transformation into a carbon generating activity led to a shift in the kinds of things that were seen as valuable and those that were perceived to be waste—with key implications for the future of Andasibe's forests and its inhabitants. These are the transformations that I trace in chapter three, as I focus on the specific logic of value that carbon credits introduced in TAMS.

In chapter four I present a historical account of the economic and political roles that the forests of Andasibe have played in colonial and post-colonial times, which are often forgotten due to a conservationist discourse on the area's pristineness. I will also show how, while always represented as the antithesis of value and relegated to a marginal position, *tavy* has historically been central to processes of forest 'valorisation'. This continues to be the case in a more acute way since, I will argue, the threat of *tavy* is fundamentally constitutive of carbon credits as a form of value. Forest carbon projects, often presented as radical new forms of valorising forests, will thus be shown to follow very specific historical trajectories of land and labour exploitation.

Instead of a natural resource or an already existing commodity, then, 'carbon' appears in the next two chapters as a particular form of value—the carbon credit—with specific capacities and effects. It is to these that I now turn.

# Chapter Three: From Fallows to Forest

## Introduction

> *'TAMS is so much more than a carbon production machine. The statement made in the 2007 report on project development still stands "It is necessary to consider if we want to make the project fit a particular market or to harness a market to facilitate our project. … There is a danger that preoccupation with meeting the demands of the market could subsume the original goals, ultimately also threatening the viability of the carbon market aspect of TAMS"'.*
>
> Louise Holloway, report for Conservation International, 2008.

When I spoke to her in 2013, Louise Holloway hadn't had proper news of TAMS for about five years. The last time she'd been to Andasibe was in 2008, when she had helped with the takeover of the project by ANAE[36], TAMS' newly appointed project manager. Conservation International (CI), Holloway claims, were very keen on ANAE taking the lead and her ceasing to be involved even in project evaluation. She left with the concern that many things remained unresolved and whenever she contacted CI or some other actors, she says, news was superficial and uninformative. The only interesting information had come from one or two project workers in Andasibe, who had e-mailed her asking her to come back and work with them again because 'things weren't working'—an unsettling yet vague piece of news. The next time she heard about the project was during our interview

36 *Association Nationale d'Actions Environnementales*

in September 2013, after my return from the field. Hearing about the apparent collapse of TAMS, and the wait and uncertainty over 'benefits' that people in Mahatsara had experienced as a result of their involvement in the project, she sounded distraught, and she commented, 'That is just utterly, utterly, tragic … the whole initial idea was sustainability for all, the people, the forest, biodiversity and it's almost like it's gone in the opposite direction'. This was the person who had sometimes been called 'the mother of TAMS' being told about its death.

In 2013, of course, TAMS was a very different object from that which Holloway had built over the previous decade. Instead of the ambitious yet locally based initiative of 'sustainability for all', as she had called it, TAMS was then (or, at least, had recently been), a forest carbon project, also known as the '*Ankeniheny-Zahamena-Mantadia Biodiversity Conservation Corridor and Restoration Project (Reforestation Component)'* at the Clean Development Mechanism (CDM) project registry. What had happened over the years to TAMS and what did Holloway mean by 'the whole initial idea' of 'sustainability for all' having 'gone almost in the opposite direction'?

In this chapter I propose to offer some answers to these questions, as I explore some of the key transformations that TAMS underwent as it became a forest carbon project. I take Holloway's (premonitory) comment above regarding the 'demands of the market' as an illustration of the form that carbon takes in this chapter. Rather than a natural resource or an already existing commodity, carbon appears here as a particular form of value—the carbon credit or Certified Emission Reduction (CER)—with a logic of its own. By carbon credits' 'logic of value', then, I refer to the specific ways of identifying, measuring and understanding worth that were introduced in TAMS through its engagement with carbon markets—that is, in its effort to transform into a CDM project that would generate carbon credits. The 'demands of the market' in Holloway's terms could therefore be understood as a set of logics and associated mechanisms that operated with the aim of generating value (carbon credits) in a forest carbon project. It is important

to point out that my aim is not to offer an explanation for the demise of TAMS, but rather to explore the effects of this specific form of carbon in the project's transition from its earlier to later stages. As we will see, the transformation of TAMS into a carbon project brought about fundamental re-organisations in TAMS that affected the key elements and objectives of the initial project—with profound consequences for those involved, especially *tavy* farmers.

In order to explore the transformation of TAMS into forest carbon project and its effects, I focus not simply on the operation of carbon credits' particular logic of value but, rather, in the re-organisation of the relationships between value and waste that this logic precipitated. Since its inception, TAMS was fundamentally a project aimed at producing value from waste[37] (as I show below), but the way this process was understood and carried out changed drastically through the project's engagement with carbon markets. In the sections below, then, I introduce two cases in which carbon's logic of value fundamentally transformed TAMS by re-articulating the relationships between what was seen as valuable and what was perceived as waste, and the consequent ways of dealing with each element.

I begin by exploring the diverse and contested roles that degraded fallows played as key element in TAMS' earlier and later stages, the way this related to the logic of value introduced by carbon credits, and its effects. Degraded fallows, I will argue, are a particular type of resource in that they oscillate between productive and unproductive pasts and futures, depending on how value and waste are imagined and articulated temporally. As we will see, different understandings and treatments of degraded fallows as waste transformed TAMS' objective from 'restoring the fallows' to 'bringing back the forest'. This, I will argue, was the necessary result of bringing carbon's logic of value into the project, since, in order to generate carbon credits,

37 The entire carbon trading system too is, in itself, a way of dealing with waste in order to guarantee tolerable levels of CO2 for life on earth. In this chapter I only focus on waste as a part of TAMS as forest carbon project.

waste—either as fallows or *tavy*—had to disappear from Andasibe's present and future landscapes. Different proposals to recover value from degraded fallows in the present, therefore, led to the recovery of different points in the past—with fundamental implications for the future of *tavy* farmers.

Leaving the fallows aside, I introduce a second case where I explore the dismembering of TAMS' constituent parts into different fragments as an effect of carbon credits' logic of value. This transformation, I argue, resulted in some elements being valorised, while others were wasted. But carbon's logic of value did not simply expel or reject certain elements from TAMS' internal structure; it also re-constituted them as something slightly—yet fundamentally—different in (carbon) productive ways. The result, as we will see, was that of socialising the costs of carbon credit production. In the conclusion I briefly present two other examples from the literature that seem to point to common themes in carbon credits' capacity to re-articulate questions of value and waste in forest carbon projects.

Waste in this chapter appears through various guises, as degraded fallows, *tavy*, or those elements in TAMS that became unproductive. I therefore draw on different perspectives for my analysis, which range from ideas on degrees of value (Thompson 1979), the role of waste in processes of recycling (Alexander and Reno 2012), its productive ambiguity (Hawkins and Muecke 2003; Taussig 2003), or its cultural semantics where issues of 'purity', 'memory' and the relationships between 'wholes' and 'parts' are developed (Moser 2002). What I hope transpires is that, far from simply a counterpart to value, the category of waste offers dynamic and productive ways of exploring complex processes of value production in forest carbon projects. Instead of a category of absolute, 'undifferentiated' worthlessness (Scanlan 2005:107), or value's dark mirror, waste will be shown to be an illuminating object.

## Back to the future: Recovering different pasts for different futures

In the next sections I draw on project documentation and interviews with project actors (especially Louise Holloway) to present the changes in TAMS' treatments and understandings of value and waste that came about through its engagement with carbon markets. I first introduce TAMS' most relevant element—the degraded fallows—and explore its temporal characteristics in relation to ideas of waste and value, where the notion of liminality comes to the fore. With this in mind, I move on to present the different ways in which degraded fallows were understood and dealt with in TAMS' earlier and later stages. Finally, I suggest that one way of understanding these changes is by attending to carbon credits' logic of value, which is premised on a past and a future of absolute value in the forest, and where any present and future possibility of *tavy* (seen as waste) must be foreclosed. It is thus, I will argue, that we can understand the change from 'the project to restore the fallows' to 'the project to bring back the forest'.

*Degraded fallows: between un/productive pasts and futures*

TAMS—*Tetik'asa Mampody Savoka*—has often been translated as the 'project to bring back the forest' (Dolch et al. 2009). Its most accurate translation, however, may be 'the project to restore the fallows', ideas of the forest being only implicit in its interpretation, but not present in its literal form. The ambiguity lies in its verb, *mampody*, which could be understood as either to bring back, change or return to a previous state/recover. It is unclear, however, whether it points to a restoration of the fallows to a previous, un-degraded state *as* fallows, or to an even earlier one as primary forest, obfuscating, therefore, TAMS' main objective through a temporal ambiguity.

Institutional definitions of TAMS have exclusively focused on the idea of bringing back the forest. In 'REDD: a casebook of on-the-ground experience' (2010), for example, produced by Conservation International

(CI) and two other transnational environmental NGOs, *Tetik'asa Mampody Savoka*[38] is translated as 'Make the Fallows Go Back to Forest' (2010:9).

Interestingly, the understanding of TAMS by its original designer, Louise Holloway, does not contain this reference to the forest. Although she was not present when the name TAMS was chosen to represent the project in one of the early meetings held by the local organisations that were coming together in Andasibe as a result her initiative, she recalls her own understanding of the name in the following terms:

> 'I understood it not to mean bring back forest but to make the *savoka* (fallows) work again... I liked that, because so much of the land had been abandoned because the *savoka* was getting more and more degraded and wasn't restoring soil fertility in the end, so the idea of making *savoka* work again was really nice … The key idea was that we were working with *savoka* to either restore it or catalyse its restoration in the form of forest linkages or for sustainable cultivation systems, so the key thing was the *savoka*'.

Although this was of course her own understanding of TAMS and does not mean it was shared by every participant, it does point, as we will see, to key contestations over the essence of TAMS. Far from a simple matter of translation accuracy, then, these diverse understandings of how TAMS was to 'restore' (*mampody*) degraded fallows illustrate one of the key transformations that TAMS underwent as it became a 'carbon project'.

In a general sense, the fallows are fields that, after having been under production for a given number of years, are left to rest so that they may regain their fertility. At this stage, therefore, the fallows lie in an interim position between productive pasts and productive futures. By allowing them

38 Which features as the reforestation component of the larger Ankeniheny-Zahamena-Mantadia Biodiversity Conservation Corridor and Restoration Project (CAZ).

enough time to regain fertility, that is, by suspending them in time, they can be (re)integrated into new cycles of production as fertile land. However, depending on how many cycles of production-regeneration the fallows have undergone, they can eventually become too degraded and lose their capacity for regeneration, at which point they become wasteland and are abandoned. The latent value they held as fallows, then, disappears because they cannot be re-introduced into new cycles of production. This does not mean that degraded fallows, as agricultural waste, are completely excluded from productive processes because even when their agricultural value has been exhausted, they can be used for firewood or pastures. Even at this stage, in fact, degraded fallows beyond apparent recovery may retain some latent value in that within longer time frames, their return to agricultural cycles could be imagined. Their decay into waste is therefore gradual[39] and subject to the specific timeframes that are employed to imagine their recovery.

Value and waste can, of course, be differently imagined. In Andasibe, in fact, the fallows are not just evocative of agricultural pasts and futures for *tavy* farmers, but also conjure imaginations of valuable or non-valuable nature(s) among conservationists. From this perspective, the fallows are identified as secondary vegetation in reference to the overgrowth that takes over the temporarily or permanently abandoned field. As such, they gain a large part of their meaning by their opposition to the primary—that is, untouched or virgin—forest, articulating a dichotomy between a valuable biodiversity and an 'invasive' or non-valuable one (this is further explored in the next chapter). Temporal imaginations are also key here because from a conservationist perspective, the abandoned grassland is thought to contain no intrinsic natural value due to low biodiversity levels and no way of going back to a 'purer' natural state as primary forest on its own. Reforestation

39 McConnell argues that the fallows in the Malagasy eastern rainforest tend to be categorised according to the degree of regeneration allowed in the following way: '*ramarasana* (just harvested); *dedeka* (1—2-year fallow), *savoka* (3—10-year fallow) *jingeranto* (secondary forest)' (2002:219). In Mahatsara, the most common way of talking about fallows is as *savoka*.

initiatives such as TAMS can therefore be seen as similar to recycling practices (explored below) in their attempt to transform waste into a renewed source of value—a sort of return to valuable pasts.

Practices of recovering or restoring degraded fallows are therefore intricately linked to the temporalities around which waste and value are articulated. It could be argued that, like the Irish bogs of the nineteenth century discussed by Taussig (2003), degraded fallows derive their peculiarity as a natural resource—or as a peculiar form of waste—by virtue of being a sort of 'suspended life-form' (Taussig 2003:12) evocative of past and future imaginations articulated around what constitutes value and waste[40]. In this wavering between states, or liminal situation, the fallows are constituted as an object of imagination of different pasts and futures, in relation to what are perceived as the appropriate ways of transforming nature for human use—that is, of producing (in this case recovering) value. How value—and consequently, waste—is understood in the present thus determines the particular point of the past to be recovered and, consequently, the kind of future being proposed. It is this productive liminality and its relation to the construction of different possible futures that I want to focus on here.

It is important to remember that the fallows are an essential stage in the agricultural cycle of *tavy*, and, therefore, the different treatments of the fallows relate directly to this question. As we will see below, the transformation of the types of futures proposed by TAMS as a result of carbon's re-articulation between value and waste had direct consequences for the future of *tavy* and those who practice it.

The aim of the section below is, therefore, to elucidate the different kinds of futures that were imagined as TAMS mutated from Holloway's

40 'In the form of peat', Taussig elaborates, 'the bog is a cheery, life-maintaining thing, to be sure. Yet as muddy prehistoric substitute for the oak forests than once covered the island, and as the remnant of what the wealthy landowners have otherwise appropriated or drained through centuries, the bog is a poignant sign of destruction, exclusion and poverty. Black butter comes to mind'. (2003:12)

initial idea of forest restoration into a carbon project in its later years. In order to illustrate this, I focus on the role of degraded fallows or *savoka*—as a key element in TAMS—and its representation in two documents that were pivotal in establishing TAMS' essence, as I explain below. In their own ways, each had the task of laying down the principles of TAMS, and taken together they are exemplary of the changing roles given to the fallows, and their position in articulations between waste and value. I complement this material with explanations provided by project actors, especially by Louise Holloway, and excerpts of consultancy reports she produced for CI.

*The project to 'restore the fallows'*

The first document is a power point presentation created by Holloway where she lays down the 'principles of TAMS' and their implementation 'in practice'. I also draw on another presentation where she delves deeper into the production of the '*savoka* garden', for reasons that I explain below. Both objects are part of a series of presentations that were produced as 'deliverables under contract to CI' and their role was to be passed on to representatives of the FAs[41] and ANAE as they took part in workshops. As such, they were key in establishing the 'vision' of TAMS from Holloway's perspective and the ways in which this vision could be attained through practice.

Holloway presents TAMS as an integrated vision of 'human and ecosystem well-being', where human well-being is defined as the situation in which 'all members of society are able to determine and satisfy their long-term needs', and ecosystem well-being is considered as the 'maintenance of diversity and the capacity to support people and the ensemble of living things'. This was to be done through a dual approach: the recovery of land fertility from degraded fallows for agricultural purposes and the recovery of forest cover through reforestation to create biodiversity corridors (where

41The FAs or Facilitating Agents were the organisations working in Andasibe in charge of TAMS' work on the ground, such as reforestation and community involvement.

lemurs, in turn, would contribute to the dispersal of plant genetic material as they would be able to move between forest fragments).

The principles of the project set out in the document conform to the general tenets of permaculture, as the document itself explains, and are centred around 'the establishment of sustainable human habitats following nature's models', and on ideas of 'working with nature, not against it'. Permaculture has been described by its proponents as a 'holistic' approach that merges 'ethical principles, designs guidelines and techniques for creating sustainable, permanent culture and agriculture' (Veteto and Lockyer 2008:49)[42]. Following these principles, then, Holloway's idea was to 'maximise' 'space', 'time' and 'production' through agricultural techniques to be applied to the fallows, which at the same time would have favoured the regeneration of the forest, to be complemented through reforestation with native species. In order to attain this vision, then, Holloway elaborated the specific objectives of TAMS in the following way:

- Restoring degraded areas to transform them into functional ecosystems.
- Re-establishing the continuity of the natural habitat between Mantadia and Vohidrazana[43].
- Facilitating the option for people to improve their well-being, especially food and tenure security.
- Facilitate the conservation of biodiversity.
- Adapt to and mitigate climate change.

42 Developed during the 70s in Australia, permaculture was posed as an alternative to dominant understandings of 'development' through the application of 'systems ecology, landscape geography and ethnobiology' to areas as diverse as the design of buildings, farming systems or urban areas (Veteto and Lockyer 2008:51).

43 This was, at that time, the proposed project area but it stretched as TAMS developed into a carbon project.

- Innovate in the use of ecosystem services market (specifically the carbon market) to attain the above objectives.
- Capture and stock carbon to mitigate climate change.

We can see how, at that time, the generation of carbon credits was but one of the seven specific objectives that made up TAMS.

As I have explained above, one of the key elements in Holloway's design of the project was the reforestation of the degraded fallows with native tree species to form the famous biodiversity corridors, in order to favour the dispersal of animal and plant genetic material, and catalyse the regeneration of the forest. The other saw the regeneration of the *savoka* into fertile cultivable land, to facilitate the settlement of itinerant *tavy* farmers and an increase in their yields. This latter initiative was to be carried out through a combination of improved agricultural techniques in land under cultivation, income generating activities such as 'fruit tree gardens', 'sustainable forest gardens' for food security (with both commercial and subsistence crops), alternatives to forest clearance through 'firewood plantations', and the '*savoka* gardens', or what Holloway described as an 'enhanced fallow system'.

The '*savoka* garden' was the key element in the restoration of arable land, its main objective being the regeneration of soils in order to 'shorten the fallow period and/or increase the yield of subsequent crops'. Through what were termed 'improved agricultural techniques' (the creation of sloped terrains, swales for water retention, or mulching techniques, among others) and planting of species that helped restore soil fertility, the *savoka* gardens were a kind of 'improved fallows' that had the aim of 'making *tavy* more durable/sustainable'. This way, the amount of land needed by a family decreased significantly—thus also reducing future forest clearance. It offered a way of maximising the five-year fallow period by planting 'trees or

shrubs' that helped 'restore nutrients to the soil and suppress weeds as well as provide useful by-products'. When a farmer, for example, finished harvesting rice from a field, she could introduce specific species that regenerated the soil while providing fruits, such as banana trees or watermelons. After five years, she would have the option of turning part or the whole of that regenerated field into *tavy*, where, if regeneration had worked, the rice yield could increase by 40%. The '*savoka* gardens' were therefore a combination of agricultural techniques to apply to the degraded *savoka* that would have favoured a faster recovery of fertility. 'The idea', Holloway explained during our interview, 'was to have this cycling, enhanced, accelerated fallows that would also be productive'.

We can begin to see how Holloway's vision of 'making the *savoka* work again' envisaged the recovery of a past where both agricultural and forest futures were contemplated. Through the '*savoka* garden' as 'enhanced fallow system', we have also seen how, within this agricultural future, *tavy* was to remain a central strategy for farmers. This, however, would fundamentally change as TAMS turned into a carbon project.

*The project to 'bring back the forest'*

Instead of 'making the *savoka* work again', TAMS' aim as a carbon project has been portrayed by institutional actors as that of recovering the fallows to 'bring back' (or 'make them go back' to) the forest (see, for example, Dolch et al. 2009; The Nature Conservancy, Conservation International, and Wildlife Conservation Society 2010).

This can be further explored through an analysis of the Project Design Document (PDD), sent for validation in 2010 to the Clean Development Mechanism (CDM) project registry. The importance of this document in producing carbon credits cannot be underestimated. The PDD (which also features in chapter 7) is the main document through which a carbon project is discursively constructed and against which carbon accounting and verification takes place, constituting the previous and necessary stage to the

issuance of carbon credits, or Certified Emissions Reductions (CERs). The role of the PDD is that of providing the rationale for the project under CDM guidelines, where the dual objectives of emissions reductions and sustainable development are presented along with the requirements of 'additionality', 'baseline scenario', 'permanence' and 'leakage'. These four key-terms, combined with accounting methodologies, may be seen as 'constitutive elements' of a CDM project since they establish the material and discursive reality of Certified Emissions Reductions (CERs) or credits. 'Additionality' refers to the 'additional' nature of the project: the fact that emissions reductions would not have occurred without the project[44]. The 'baseline', as I explained in chapter one, constructs the 'counterfactual scenario' (Lohmann 2014) against which the number of reductions can be calculated. 'Permanence' and 'leakage' finally, refer to the fact that the project is sustainable over the 30 years it is supposed to last and that the source of emissions targeted by the project will not 'leak', or relocate elsewhere. The PDD also contains any other relevant information regarding the project's implementation, such as project boundaries or land eligibility. TAMS' PDD was mainly written by CI with the BioCarbon Funds' (BioCF)[45] support and with help from ANAE for on-the-ground data. The name TAMS does not appear, however, and the project is referred to as the '*Ankeniheny-Zahamena-Mantadia Biodiveristy Conservation Corridor and Restoration Project (Reforestation Component)*'. The PDD introduces it as an initiative that will:

> 'restore rainforest habitat and establish native forest corridors between fragmented blocks of remaining native forests…The project activity makes an important

[44] Or, what is the same, the fact that carbon finance is needed for a project to take place (Lansing 2011:735; Bumpus and Liverman 2008).

[45] The BioCF is the World Bank's Carbon Finance Unit and uses private-public funding to carry out demonstration activities of forest and agro-ecosystem carbon projects.

> contribution to the conservation of biodiversity in one of highest areas of terrestrial biodiversity in the world'.

As a CDM project, it also claims to support sustainable development by 'providing farmers with alternatives to unsustainable slash-and-burn agriculture' and assisting them 'to diversify and improve their agricultural production, and to establish native forest plantations and fuel wood plantations outside of the project' enabling 'low-income farmers to realise value from [these] fallows through the sale of CERs while also carrying out natural forest restoration'. It is thus that the project is presented to fulfil 'the project purpose of alleviating poverty while conserving biodiversity'.

As will be explored below, one of the key differences with Holloway's project is that reforestation in the PDD is identified as the main 'project activity', being the only one that will generate carbon credits. The rest of the activities introduced by Holloway are borrowed, yet grouped into 'leakage' measures. As I explained above, these are measures that every PDD must contain and are geared towards making sure that the 'problem' targeted by the project is not displaced outside its boundaries; in this case, 'leakage' would have to ensure that no further land encroachment for *tavy* takes place as a result of project activities:

> 'The project proponents are implementing a number of measures to mitigate potential leakage as a consequence of the project activity. These measures include providing strong support to farmers to enable them to diversify away from *tavy* to more sustainable agricultural practices; as well as the implementation of fruit gardens, *savoka* gardens, sustainable forest gardens, native forest plantations and fuel wood plantations. It is noted that these measures are not project activities that will generate CERs, *but these measures are implemented to*

*prevent leakage and to contribute to the development of the local communities*' (emphasis added).

Although TAMS as a CDM project in the PDD contains the same elements as those proposed by Holloway (reforestation with native tree species, fruit gardens, *savoka* gardens, sustainable forest gardens, native forest plantations, fuel wood plantations and training in improved farming techniques) they are conceived of in a fundamentally different way. We have already seen the separation between reforestation as main project activity and the rest as 'leakage' and 'development' measures. This fragmentation is not a simple division but had profound effects in TAMS as I show in the next section. Here, instead, I want to focus on the role of the '*savoka* garden', and the approach taken with *tavy*. We can already see a fundamental transformation in that agricultural activities are offered as alternatives to *tavy*, which is deemed an 'unsustainable practice'. This is taken further in the way the '*savoka* garden' is conceptualised in the PDD:

> **'**Savoka forest gardens**:** The project assists farmers to establish sustainable forest gardens on their land. The area and location of land that farmers dedicate to the sustainable forest gardens is at their discretion. The sustainable forest gardens will provide to farmers an alternative use of degraded, unproductive *tavy* lands — particularly those on hillsides. These lands are no longer useful to local farmers[46], are particularly prone to fire and are at risk of further degradation through soil erosion. The establishment of sustainable forest gardens on these lands brings three main benefits:

46 This is already a contentious claim because as some of Mahatsara residents complained, the lands dedicated to TAMS were some of the 'most productive ones'. It already points to very different views on the value of the *savoka*.

- it permits the reclamation and regeneration of what is essentially abandoned land;
- it enables farmers to produce high-value crops, providing them with added sources of food and income and to enable their shift from *tavy* agriculture;
- local tree species make up a significant proportion of the plants used to create forest gardens; so these can be planted to mimic local natural forests in both structure and function.'

It must be remembered, that, as I explained above, the *savoka* garden was the main activity proposed by Holloway for the restoration of arable land—a point she made in a consultancy report for CI in 2008**,** where she requested further input into this element arguing that it was 'an important activity because it is culturally very acceptable (even 'in demand') as well as meeting the requirement to maintain rice production on hillsides'.

What we find in the PDD is however very different. In this paragraph, in fact, the '*savoka* garden' and the 'sustainable forest garden' seem to have merged into one single element as the title above shows: 'the savoka forest garden'. Although they appear in the earlier paragraph on leakage measures (see above) as different elements, they become one and the same when they are detailed. In its reworked form, in turn, the '*savoka* forest garden' appears as an element to facilitate farmers' shift *away* from *tavy* and a way of establishing alternative plantations. The regenerated *savoka*, which contains, in Holloway's model, the potential of future value *as tavy* field is here deemed unproductive, as it is to be replaced with 'high value' crops (where 'no-burn hill rice' production is contemplated under a 'fireless regime', however). We can already see some of the ways in which ideas of value in TAMS' later stages re-articulated those of waste, since as *tavy* could

not provide high economic value, it was relegated to a de-valued position, or, one could argue, to waste.

When I spoke to Holloway in 2013, and she shared the presentation I have employed above to illustrate her understanding of TAMS, I was significantly surprised to see that the *savoka* garden contained the option of turning land back to *tavy*. As she explained during our conversation the idea was to 'develop sustainable systems that were incorporated into people's desires to continue with *tavy*'. This was something that had never been brought out during my conversations with project actors during fieldwork, nor did it appear in any project documentation I'd had access to. When I showed Holloway, in turn, how the '*savoka* garden' had been reworked and introduced in the PDD she commented that it must have been done by someone who'd had no experience of work on the ground, judging by how forest gardens were mixed up with *savoka* gardens, also containing phrases from other documents. I suggest, however, that this 'confusion' had much more to do with the logic of value that carbon credits brought about in TAMS, its treatment of degraded fallows as waste and the fundamental transformations that were needed in Holloway's design for the project to become a carbon generating one. In order to produce carbon, I argue below, *tavy*, and consequently the *savoka* garden, had to be devalued—or wasted away—and forgotten.

*Changing visions of TAMS: restoring nature to different ends*

Whether to return them to a previous un-degraded state as fallows, or to an earlier one as forest, the restoration of degraded fallows points to a process of recovering value from waste, and thus shares similarities with practices of recycling. From a Marxist perspective, recycling seems to 'intercede' (Alexander and Reno 2012:1) in the transformation process of objects and materials from their original, 'first' nature into a 'second' one, or their integration into the social world through human agency (Lukács 1971). Instead of transforming nature for social purposes, therefore, recycling

entails the 'return' of materials and objects already present in social spheres to their original state—in order, however, to begin the cycle of transformation again in a re-valued form[47]. But where practices of restoring the fallows share some fundamental elements with those of recycling in their attempt to re-introduce perceived waste into productive processes, they differ in the character of the matter to be transformed. While recycling aims to transform things into something else completely, *mampody* (return/restore) here points to a practice of recovering the pre-state of perceived waste, almost as a form of 'resuscitation' (Cooper 2006). Its contentious character lies in the specific point of the past that is being recalled, since different moments in the past conjure different views of what waste is and where value lies. They project, in turn, different future possibilities.

If seen as instances of 'resource making' 28/03/2016 06:56:00 from waste[48], the degraded fallows' key defining feature appears as that of 'potentiality': a position 'suspended between a past source and a future product' (Elizabeth E. Ferry and Limbert 2008:6) where both past and future states are articulated around ideas of what constitutes the right kind of nature and, therefore, its perceived value. This 'potentiality', however, must not be seen exclusively as the domain of what appear as 'valuable' resources, but can also be applied to waste.

Although Thompson (1979) has conceptualised waste, or 'rubbish', as the stage in which objects lose their 'transient' value and become the 'degree zero of value' (a necessary stage before they enter once again a different

47 The division between a 'first' and 'second' nature in such processes, therefore, becomes tricky because although recycling entails the 'production of originals' (Alexander and Reno 2012:2), these are not intended to go back to nature as such, but are rather expected to recover their productivity as constitutive elements of potential new objects and materials and therefore begin a new production cycle. The idea of restoring degraded fallows is itself an apt way of illustrating how 'the boundaries between the natural and social are continually being crossed' (Elizabeth E. Ferry and Limbert 2008:8) making distinctions between a 'first' and 'second' always blurry.

48 I understand the term resource in the broadest possible sense, as 'objects and substances produced from nature for human enrichment and use' (Ferry and Limbert 2008:3), and not necessarily defined as such by those engaged in bringing them about.

value register), I follow recent analysis in seeing waste's moments of 'indeterminacy' (Hawkins and Muecke 2003:xii) or 'ambivalence' (Moser 2002:91) between positive and negative value regimes as a source of its generativity. Therefore, rather than totally devoid of value, in this wavering between states waste contains in itself the possibility of re-generation or the recovery of value.

This applies especially well to degraded fallows in that, as we saw earlier on, their most defining feature is precisely this ambiguity: their liminal position between value and waste, pasts and futures. Degraded fallows in the case of TAMS then conjured the potentiality of their recovery as a return to valuable pasts. What we find in the cases presented above, however, are two very different understandings of the meanings and potential value of degraded fallows as waste in present and future landscapes, and thus two diverse proposals for their recovery or transformation that also call upon different moments in the past.

Holloway's project, on the one hand, aimed to incorporate waste—the degraded fallows—by harnessing its potentiality and incorporating it into cyclical processes of production, according to the tenets of permaculture. The treatment of waste in permaculture is in itself particularly revealing of the kind of potentiality, or value, that waste is seen to possess. Although a heterogeneous movement that has evolved over the years, permaculture is largely based on the creation of 'closed-loop, symbiotic, self-sustaining human habitats and production systems that do not result in ecological degradation or social injustice' (Veteto and Lockyer 2008:51). The concept thus contains in itself a very particular articulation between time and waste, as it is premised on a cyclical and integrated approach where waste is constantly re-integrated—through nature's own work—into processes of production for both social and environmental benefits. The idea of avoiding degradation—both ecological *and* social—is illuminating here of permaculture's understanding of waste: rather than its disappearance due to its zero degree of value status (Thompson 1979), permaculture promotes

the continued and cyclical transformation of waste as potentially (and indefinitely) valuable (human excrement, for example, is transformed into manure, and thus generative of future cycles of production). As a slide in Holloway's presentation claims regarding the 'principles of permaculture': 'all is recycled: productions are entries'. This is reflected in the treatment and understanding of degraded fallows (and consequently *tavy*) in TAMS according to Holloway's vision: far from zero-value, the degraded fallows that result from *tavy* hold the potential of recovery of value both as fallows and forest, as they are put to work again through the restoration of the forest and the '*savoka* garden'. Acknowledging that current land limitations in Andasibe do not allow for the long term frameworks needed for a 'natural' recovery, Holloway's project envisaged an acceleration of this process, by nurturing the (re)generative capacity of degraded fallows as waste.

The understanding and treatment of degraded fallows as waste in the PDD, is, as we have seen, completely different. In this case, the generative capacity of degraded fallows is only recognised as the possibility to turn into something else completely: either as forest generative of carbon value, as agricultural alternatives with high economic value or as 'leakage' or 'development' measures constitutive of a forest carbon project. In any case, the recovery of the fallows as a necessary stage in the agricultural cycle of *tavy* is negated, as is *tavy* itself. It would seem that in this case, the degraded fallows acquire that 'degree of zero-value status' advanced by Thompson (1979), and their 'recovery' would refer to their total effacing, since value is only located in the return of the forest. The recovery of the fallows in TAMS as carbon project therefore proposes the end of waste—a future where all is valorised through carbon and where *tavy* or the fallows have no space. The purity of the primary forest in this version of TAMS is thus no longer just a matter of environmental pristineness (as in conservationist ideals of nature) but also economic: the end of environmental and economic waste is proclaimed in the return of the primary forest, now re-valorised through carbon. The future holds only forest, and, hence, only value. In a sense, then,

'bringing back the forest' resonates with ideas of a return to a prelapsarian Eden (see also Alexander and Reno 2012) which, combined with a newly discovered source of value of nature, propose the obliteration of impurity, as fallows and *tavy* are negated. So what was carbon's role in precipitating this change?

As I argued in the introduction, what a CDM project aims to produce is not so much a carbon absorption—the carbon that is 'stored' in trees—as a carbon *reduction*, known in the CDM process as a 'Certified Emission Reduction' measured in tonnes of CO2 equivalents (*tCO2e*). The idea of a reduction is constructed through those four key-terms or 'constitutive elements' I introduced above: additionality (the fact that reductions are additional to what would have happened in the absence of the project), permanence (the securing of reductions for the period that a project lasts), leakage measures (to avoid displacing the problem elsewhere) and baseline (a counter-scenario based on a projection from the past into a hypothetical future without the project against which reductions are calculated). We already saw that one of the main differences with Holloway's project was that TAMS as carbon project proposed leakage measures where the '*savoka* garden', and the option of going back to *tavy* were missing. This was, I argue, because the possibility of *tavy* could not be entertained as a part of leakage measures, as these were explicitly set up to avoid new sources of emissions. Seen from a different perspective, if the project aimed at achieving 'emissions reductions', the way of maximising value was to produce no emissions whatsoever: in order for carbon value not to be wasted, then, leakage had to erase the possibility of *tavy*. TAMS as a forest carbon project could thus not propose a future where *tavy* was present.

It is in this logic of value, that, I argue, we can find the transition from TAMS as a project to 'restore the fallows' to the project to 'bring back the forest'. We can further explore this through a slightly different take on waste's liminality, drawing on Moser's (2002) conceptual analysis of waste. Arguing that waste has recently seen an 'accession to culture'—due to the

effects of industrialisation, the emergence of ecological awareness, and more—Moser proposes a series of semantic and conceptual analyses to 'comprehend the cultural transformation being brought about by the multiform presence of waste, as both discursive and material reality' (2002:85). His analysis of waste through the concepts of 'purity, value and memory' (2002:89) is particularly useful for exploring the liminality of fallows in TAMS and their changing role. As a 'category of transition', Moser argues, 'waste is that unstable position in which purity seesaws with impurity, value with non-value, memory with forgetting' (2002:102). An important 'semantic component' of waste is therefore 'memory' (2002:97). He develops this idea from Douglas' (1966) conceptualisation of rubbish as being something 'out of place' which is, however—and this is key—still present. Rubbish or waste is therefore always in a state of 'in-between': a decayed state where waste has lost its 'functionality' in the previous system but from where it has not been completely effaced and retains part of its previous 'identity' (Moser 2002:97) (otherwise waste 'could not be known'). We can see how degraded fallows, and their identity as having once been part of the cycle of *tavy* (and before that the primary forest) fit this idea of waste. It is in this transitional or 'in-between' state that 'the waste-object conserves all the memorial capacities with regard to the system to which it once belonged' (Moser 2002:97). This is, therefore, also the stage where waste 'represents the most virulent danger to the 'purity' of the system' because at this 'constitutive stage' (see also Waldby and Mitchell 2006:109), waste has the dangerous capacity to 'induce remembrance' (Moser 2002:98).

We have seen how, in order to produce value as a carbon project, TAMS proposed a future of purity without waste: a pristine, wasteless future in both economic and environmental terms (which effectively merge in the carbon credit). Since the fallows could not be contemplated in the future proposed by TAMS as carbon project, they also had to be forgotten in the present—lest they evoked the future possibility of *tavy*, thus wasting

potential carbon value. One way to do this was by reaching to an earlier past—the primary forest. Through the discursive and material obliteration of the fallows, then, TAMS constructed a future return to a past without *tavy* in the forests of Andasibe. It is here that we can locate TAMS' specific transition from a project 'to recover the fallows', to one engaged with 'bringing back the forest'.

In this section I have explored TAMS' mutation from its earlier to later stages and the different treatments and understandings of degraded fallows as waste that were introduced through carbon as a logic of value. But this was not the only way in which carbon credits as a form of value altered TAMS' original shape. As I already suggested above, another key transformation was the disaggregation of TAMS constituent elements into individual ones. Although TAMS' external form did not change substantially, then, its internal structure did, with fundamental consequences (Alexander 2004). It is to these that I now turn.

**Recovering value from TAMS' own waste**

In this section I leave degraded fallows behind and explore re-organisations of waste and value through a different perspective. Waste appears here as those elements integral to TAMS that the project itself expelled as a result of carbon credits' logic of value—only to recover them again in a different, yet valuable form. Let us see how.

In Holloway's presentation introduced above, where the principles of TAMS are laid out, one of the slides presents TAMS as a cyclical landscape containing the six key activities that make up the project. These are: natural forest restoration, the plantation of mixed autochthonous species, sustainable forest gardens, sustainable fruit gardens, *savoka* gardens and coal/firewood.

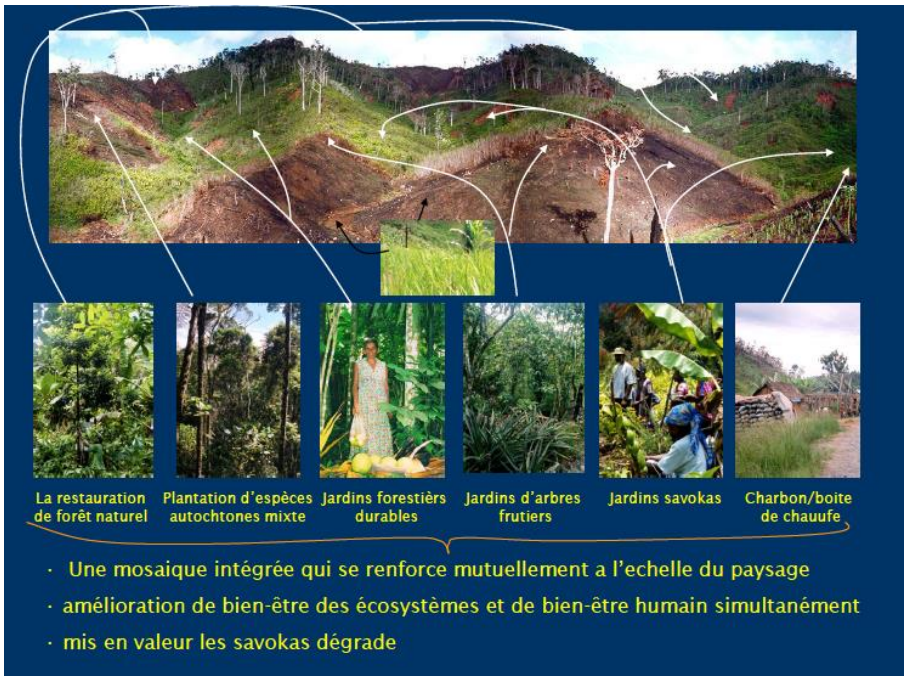


**Figure 8. TAMS as an 'integrated mosaic'. From Louise Holloway's power-point presentation: 'Vision en practique-les principes'.**

Together, they compose what the slide names an 'integrated mosaic that mutually reinforces itself at the landscape level'. One of the key transformations that TAMS underwent in its transition towards a carbon project was the fragmentation of its constitutive elements, until then understood as composing a whole, into two different types of activities which, while related, ended up operating independently of, or even vying with, each other. Instead of a project with six integrated approaches to land management, then, TAMS became conceptually understood as being composed of two main elements: a reforestation component with native tree species for carbon generation and a development one to 'accompany' (Borges Coutinho 2010:5) it, known as Sustainable Livelihood Activities, or SLAs, which was made up of the agricultural activities and techniques previously mentioned. Rather than just a means to 'attain' (Holloway's term in the presentation) the project's objectives then, carbon mutated into the very aim of the project itself.

The disaggregation of TAMS into two types of elements, restorative and agricultural, had profound effects on its implementation. With carbon

generation as the guiding principle of the project, both conceptually and economically, the rest of the activities—once integral to the project—were relegated to the background, with crucial implications for the farmers involved.

During our interview Holloway explained that

> 'at the outset, when we were seeking the carbon finance, we did it so the whole thing was integrated, so carbon finance would be for any activity that actually increased the carbon value of the area … and it was only through working with CI and the World Bank and focusing on the carbon issue, that they then got separated out'.

The divide between forest restoration and SLAs, she speculates, had to do with the problem of measuring the carbon stored in trees, something that really worried CI in Washington. Diversity of tree species, she argues, felt 'burdensome' for some of the actors dealing with carbon measurements, since, originally, people were to have the option of choosing seedlings among 100 different species, a flexibility which Holloway claims 'was not liked'. At some point in 2004, the possibility of receiving carbon payments for both SLAs and natural forest restoration was entertained among CI and the BioCF, in the understanding that natural reforestation would have received 'higher payments' (Holloway report). This was later on revoked however, and agricultural activities were finally deemed unproductive in carbon terms. As Holloway recalls, 'When the carbon measurements for the baselines came out […] they didn't feel that the gardens would sequester sufficient, additional carbon to make it worthwhile, and so that was the decision'. In a similar fashion to the 19th century German forestry science, as described by Scott (1998), where the need to manage plantations from a centralised position (for fiscal purposes) led to unsustainable monocultures, we see here that practices of measuring and accounting for carbon were, ironically, complicated by biodiversity itself. From this perspective, then, we

see the importance of metrics in forest carbon projects, where only that which can be measured becomes valued and hence, valuable (Cooper 2015).

The disentangling of the carbon element of the project into a relatively independent object only contemplated for forest restoration, and the relegation of all other activities to the area of SLAs meant that the latter was left unfunded for a good number of years, and would only be eventually applied very timidly. Funding came too little, too late, and only as a result of the strenuous involvement of a student who managed to push major donors like USAID to sustain livelihood activities. Joanna Borges Coutinho arrived in the field as part of her MSc research in International Natural Resources Development at the University of Bangor, with the prospect of setting up and carrying out research on fair-trade activities within TAMS, as it had been agreed with CI and various other actors. Although she had been told that many opportunities existed for fair-trade arising out of the agricultural side of the project, upon her arrival in Andasibe in 2006, she found that 'no-one had heard of TAMS, and those who had only had to do with the restoration' side of it. Her involvement in the project led to her return in 2009 in the role of consultant for CI with the objective of setting up the SLA activities, and her efforts paid off as she managed to secure $250,000 from USAID's ERI (Eco-Regional Initiative) programme to support the agricultural activities within TAMS (to which USAID had originally committed). The money was spent on training sessions for FA (Facilitating Agents) staff and farmers and on setting up 'demonstration gardens' in a small number of villages involved with TAMS[49]. These demonstration plots were carried out with the idea of showing farmers the benefits of, and training them in, the agricultural techniques developed by Holloway for the *savoka* gardens, such as the mulching technique in sloped terrains. ANAE, under Coutinho's supervision, were also trained in SLAs and became key actors in the provision of seeds and training in agricultural techniques. In any case, funding for SLAs was

49 Mahatsara was one of the three villages.

always limited and it never transformed into real agricultural alternatives to the land given by farmers to the project, but remained solely a 'demonstration' activity. In a 2008 report to CI, Holloway stressed the 'fundamental importance' of SLAs 'to the people living within the operational area of TAMS' and showed her concern for the lack of measures available 'to help anyone inspired by the demonstration plots to start their own gardens'.

We can see then how carbon as a logic of value led to the fragmentation of TAMS into its constituent parts—previously understood as an integrated whole—where only those elements that could be measured and were carbon productive became valorised, relegating the rest to the background.

This process shares interesting parallels with those of privatisation in post-socialist countries. In her ethnography of privatisation processes in Kazakhstan, Alexander (2004) explores, among other things, the reconstitution of objects and persons—and the relations between them—that the move from state to privately-owned property brought about. The case of industrial enterprises is particularly illuminating here because, while 'outside forms were maintained' (2004:310), privatisation involved the legal reconstitution of the enterprises' internal forms: their 'properties' as property objects. As a result, certain elements became profitable while others were left, literally, to rot. The breaking up of the relational parts that had previously constituted a 'holistic system' translated into Kazakhstan being 'littered with dead factories and steppe cities built around huge processing complexes that have become half-abandoned urban disaster zones' (Alexander 2004:310), that is, waste.

Both in the Kazakh example and in TAMS, then, we find a relationship between processes of fragmentation of constituent wholes and changes in the location/recognition of value, where some parts become profitable and others are effectively 'wasted' as a result. I briefly return here to Moser's (2002) semantic analysis of waste, this time through his view on the

relationships between fragments and wholes from which, he argues, waste gains a great part of its meaning. Well illustrated through the French term '*déchet*', waste, he states, 'is often fragmentary, partial, residual in relation to a totality that would have preexisted it' (2002:86). In this arrangement between parts and wholes, waste can appear as either that which remains out of a previous totality, that which 'passively detaches itself from a whole' through decay, or as rejection or refuse— 'that part which has been actively detached (torn, ejected, expelled) from a whole and subsequently cast off and excluded' (2002:87). It is this last sense of waste that I think is useful in helping us think through the effect that carbon had in TAMS: the agricultural activities that were grouped into the concept of SLAs were expelled and rejected as unprofitable. They became almost waste.

The 'almost' is essential here, however, because as I show below this was only a partial disconnection. Although what were once essential agricultural activities were relegated to a minimal role in terms of project implementation with very little value, they were re-incorporated into the project in a renewed relationship. Their potentiality—as something slightly different—was in fact recovered through carbon's logic of value.

This idea of disconnecting and reconnecting has been employed by Hayden (2003) to characterise the political work that bioprospecting 'benefit-sharing' agreements carry out in Mexico. Her analysis of the ways in which these agreements seek to establish flows of plants and information (or 'local knowledge') on the one hand, and benefits on the other, contain a decisive element in which connections are both 'made' and 'unmade', according to changing conceptualisations of what constitutes the public sphere. Along with the plants collected, Hayden argues, bioprospecting agreements that link rural locales in Mexico to pharmaceutical companies in the US, also bring people associated with them—but which people and with what rights and responsibilities becomes a highly contentious issue, one riddled with the questions of where to draw the line between the public and the private domain. For example, in order to bypass the difficulties of

ascribing claims to authorship/ownership of local knowledge among communities, scientists select particular sites—urban markets or roadsides—and construct them as 'public' domain for collecting both specimens and information, thus disconnecting plants from the 'messy' (Hayden 2003:46) social relationships to which they were once attached. Market vendors, in this context, are not considered rightful benefit recipients, but only intermediaries to the right kinds of people: an ever elusive 'community' which becomes very difficult to pin down, but which nonetheless remains as the archetype of the sharing agreement beneficiary. Plants are therefore reconnected to these necessary yet almost abstract actors. This is a 're-localising' practice, Hayden argues, where plants appear as 'stabilized, fixed in identifiable webs of social relations', because it re-establishes the 'correspondences and connections for which locality stands' (2003:130), consequently producing inclusions and exclusions.

A not too dissimilar process of disconnection and reconnection can be observed in the development of TAMS as a carbon project, as I now discuss.

Even if SLAs had very little to offer to farmers other than some training in agricultural techniques and a few 'demonstration gardens', they performed an essential role in the framing of TAMS as CDM project. As we saw before, TAMS had to comply with the dual objective of reducing carbon emissions and contributing to sustainable development—it is only through this dual approach that a project can be integrated into the Clean Development Mechanism, and thus generate carbon credits. In turn, the project has to comply with the measures of additionality, leakage and permanence, as well as the methodological approach to the calculation of carbon reductions. I have already mentioned how SLAs were presented in the PDD as both the 'sustainable development' component of the project, and as a 'leakage' measure, that is, as guarantors of the permanence of reforested plots. SLAs, therefore, provided the rationale through which TAMS could be framed as the '*Ankeniheny-Zahamena-Mantadia Biodiveristy Conservation Corridor and Restoration Project (Reforestation Component)*'

and appear as CDM compliant. They became, therefore, key in generating (potential) carbon reductions.

A second similar situation took place in relation to carbon payments and benefits. The original intention of providing direct payments to farmers from the benefits obtained through the sale of carbon credits was thwarted for various reasons. One of the most cited ones among project actors was the involvement of the government and its demand of sole carbon ownership, something which was agreed in the expectation that profits from carbon sales would then be passed on to individual farmers, which never happened. But while direct payments were from the beginning on top of the table, these were never really agreed upon, and were variously taken up and rejected by changing staff in CI and the BioCF. Even if direct payments were at some point entertained, these were ruled out early on when it transpired that the costs of setting up the project and producing carbon in the first instance were too high to allow for payments to farmers. In a 2005 report, Holloway already makes the point that it is

> 'ironic that low payments/tCO2 offered by the BioCF combined with high preparation costs (heavy bureaucracy and stringent eligibility criteria), make even the highest carbon generating activities too costly to allow the project to make direct carbon payments'.

We find here that carbon as a logic of value is also entwined with a clash of temporalities, where low levels of initial funding—as carbon payments are only made after reforestation and verification—couple with a costly validation process, making only those activities with highest carbon value at the outset worthwhile or productive.

In the absence of direct carbon payments, therefore, 'development', in the form of SLAs, became the main form of compensation. As André Aquino from the BioCF told me during our interview:

> ‘We had a lot of discussions whether this [benefit sharing] should come as cash or as development projects, and I think the agreement was not cash, but rather supplements to the activities that ANAE were already providing to the communities in terms of agriculture, improve their agriculture, seeds, inputs, machinery, and so on …’

The agricultural activities that had once been an integral part of TAMS and had later on been rejected as unprofitable, were once again recovered—albeit in a diminished and devalued form—as productive of carbon value by becoming the ‘development’ element that could justify the framing of TAMS as CDM project.

This departed fundamentally from the way carbon had been conceptualised in Holloway’s vision. As she recalls, ‘SLA would almost be compensation for the reforestation … and that was in my mind, utterly wrong, that’s not how people had actually viewed it, in the first place’. What had begun, in Holloway’s words, as a project in which ‘rice cultivation and the cultivation for subsistence would be subsidized by the carbon credits’ became exactly the opposite: a project in which the production of carbon credits was subsidised by subsistence agriculture through the idiom of the SLAs as ‘development’, ‘leakage measures’ and ‘compensation’.

We can see here a two-way process of disconnection and reconnection. Initially, we saw how carbon credits’ logic of value led to the fragmentation of TAMS into two elements since only one was measureable and, therefore, valuable. The other, those agricultural activities that were turned into SLAs, became a sort of residue, almost rejected by the project as an unprofitable and un-fundable element. But, on the other hand, this ‘wasted’ component was recovered as generative of value by providing the rationale for the project as ‘sustainable development’ and shifting a conversation on

(expensive) carbon rights into one of compensation, with costs thus displaced onto SLA/*tavy* farmers.

Like the buildings described by Alexander (2004) in Kazakhstan, then, while the outside form remained the same, TAMS as a carbon project was internally reconstituted through the transformation of the SLAs' relation to the project: having been once expelled, they were recuperated for the generation of carbon value.

The material or on-the-ground effects of this internal re-organisation of TAMS were not perceived in a straightforward sense, since they could only be known through their 'absences': the absence of credits, benefits or agricultural alternatives that extended beyond mere 'demonstration gardens'. Some of these absences are explored in chapter 6, where I introduce feelings of having been cheated among those who took part in, and gave land to, TAMS in Mahatsara. There is, however, a key piece of material evidence of the impact that carbon's re-articulation of value and waste had on *tavy* farmers, one which relates to the main embodiment, or actual presence, that carbon takes in forest carbon projects: trees.

In 2013 Maman'i Solo, whose husband had devoted a parcel of their *savoka* to TAMS, complained that the tree seedlings, *zanankazo*, had been planted in the best piece of land, 'where the *dingadingana* grows', and did not know what to do. The *dingadingana (Psiadia altissima)* is a type of bush or grass that grows in recent forest clearings or early-stage *savoka* (Kull 2004:158–159) and thus marks a relatively high fertility. When we joked about the possibility of cutting them and turning them into firewood, Maman'i Solo laughed and said they were too scared to do that, lest they were sent into prison. The effect, of course, was that the harvests of following years would not live up to their (already meagre) potential since these fertile fallows could not be used. We have here, therefore, a perverse turn on carbon's proposal of futures of value in these landscapes: a productive field in carbon credit terms of no value whatsoever to Maman'i Solo, which, in turn, wasted its potential as *tavy* field.

It is therefore not surprising, then, that upon hearing of the trajectory of TAMS, Holloway felt that everything had gone the 'opposite direction', since in this chapter we have seen that the only thing that was made (apparently) sustainable was the production of carbon—and not even. From 'sustainability for all', carbon as a logic of value had turned TAMS into 'sustainability for none'.

## Conclusion

In the previous sections I have shown how carbon credits' logic of value fundamentally altered both TAMS' main aims and its internal structure—with key consequences for those involved, particularly *tavy* farmers. If the 'project to bring back the forest' eliminated any possibility of a future with *tavy* in order to maximise carbon value, the devaluation and rejection of agricultural activities and their transformation into SLAs replaced (expensive) rights to carbon payments with (underfunded and underdeveloped) 'development', thus socialising the costs of carbon.

It is essential to mention, however, that by referring to carbon credits' logic of value I do not imply a single and coherent framework that was simply applied to TAMS. As we have seen, in fact, this 'logic' was often unclear to carbon actors themselves (who are, in any case, a heterogeneous group), and decisions were often made ad-hoc and through negotiations that acknowledged uncertainty, as in the case of carbon measurements or in debates between direct or indirect payments. In trying to expose carbon as a logic of value, then, I have aimed to explore carbon credits' capacity to reorganise questions of waste and value in TAMS, but I do not imply these are unavoidable or follow an already set and established logic.

A look at another two examples of carbon projects, however, does reveal a certain consistency in the way carbon's logic of value tends to treat (and produce) waste in agricultural landscapes.

Leach et al. (2012), for example, talk of a process of 'disciplining' in biochar pilot projects in Africa whereby farmers' agricultural practices need to align with 'biochar schemes and their underlying technological and market logics' (2012:300). Biochar is a carbon rich substance that results from the burning of biomass 'under oxygen-deprived conditions' (Leach, Fairhead, and Fraser 2012:285). It has been posed as an effective way of recovering soil fertility, and lately, as a space with great carbon capture potential, having led to a number of small pilot-projects across Africa. In some of these cases, however, the authors point to situations where complex agricultural practices are broken down or homogenised to fit 'singular systems' and 'cycles' for the collection, burning and burying of biomass. Here, those elements that are not included in the 'biochar system logic … developed in hypothetical models' tend to be 'sidelined and ignored, or newly targeted as problematic and in need of transformation' (Leach, Fairhead, and Fraser 2012:300). A case in point is the way 'the vast diversity of biomass by-products that result from farming and everyday practices' are 're-labelled as agricultural wastes' (Leach, Fairhead, and Fraser 2012:300), becoming productive in biochar terms, yet displaced from their myriad uses in local lives and landscapes. We can see how issues of fragmentation and relegation to waste of potentially valuable elements also make an appearance here.

Even more revealing is Lansing's (2011) analysis of a forest carbon offsetting project in Costa Rica, where, in a similar way to TAMS, the project's trajectory changed as a result of a cost-benefit calculation that was needed in order to prove the project's 'additionality' under the CDM[50]. From its original goal of reviving cacao agroforestry, the project mutated into one concerned with the elimination of slash-and-burn agriculture by allowing *rastrojos*—recently fallowed land—to go back to secondary forest. This

50 Lansing treats the cost-benefit calculation as 'a discursive statement that enables the creation of value' (2011:732). I would argue that rather than just 'enabling', the cost-benefit calculation, as part of what I have termed the 'constitutive elements' of a CDM project, is inherent to value production in forest carbon projects.

transformation came about as a result of a cost-benefit calculation that showed that the opportunity cost of switching to cacao agroforestry was too high to prove the project's additionality. Rather, *rastrojos* appeared as sites of great carbon sequestration potential, because carbon credits could provide the encouragement to switching that was missing in the case of cacao agroforestry. This calculation was, however, made possible by representing *rastrojos* as separate spaces devoid from 'past and future relations with other forms of land-use' and as 'empty containers of low economic value' (Lansing 2011:743), that is, as present and future waste. An important issue that Lansing raises is that the elimination of *rastrojos*, or fallow land, in order to generate carbon value could lead to future ecological damage and the loss of food and livelihood security by participating farmers, due to the social and ecological roles that *rastrojos* play as part of agricultural cycles. This, he argues, could 'potentially run counter' (Lansing 2011:732) to the project's aims.

Holloway's statement presented above that 'there is a danger that preoccupation with meeting the demands of the market could subsume the original goals [of the project]' resonates here powerfully. As a specific way of identifying, measuring and understanding worth, then, carbon credits' logic of value seems to point to some common themes in its dealings with waste in forested or agricultural landscapes.

*

In this chapter I have explored the social life of carbon as a particular form of value—the carbon credit—and its associated logic, as I focused on its transformative capacities in re-articulating questions of value and waste in TAMS. We have seen how, as a forest carbon project, TAMS proposed a future of absolute ecological and economic value in the forests of Andasibe, where any trace of waste—as degraded fallows or *tavy*—had to be erased

from past, present and future landscapes. The 'project to restore the fallows' became 'the project to bring back the forest'.

This, however, is but one side of the story. In the next chapter I will show how the very same logic of value that I have explored in this chapter, and which seems to negate any form of waste in forested landscapes, is, in fact, greatly dependent on it: carbon value in its credit form can only come about through its articulation with *tavy* as waste.

While carbon credits are today presented as a novel source of value, their dynamics of value production in relation to *tavy* are not, however, a recent development. Through a focus on historical processes of forest 'valorisation' in Andasibe, I will show how TAMS as forest carbon project establishes key continuities with past forest economies, as it pushes *tavy* to the margins as a wasteful practice while drawing on it for the production of value. We will therefore see how 'the project to bring back the forest' never erased *tavy* from view, but displaced it to a marginal yet productive position.

# Chapter Four: The Values of Deforestation

## Introduction

The story usually runs as follows:

> 'The 2003 Dreamworks movie Madagascar had it right: This island is like no place on Earth. Imagine a place filled with small, strange looking creatures roaming a landscape ranging from lush forests to drier, sometimes spiny forests, where giant bottle-shaped trees mark the skyline. This is Madagascar…
>
> Off the east coast of Africa, Madagascar's geographical isolation from the rest of the continent means it is chock full of animals and plants found nowhere else in the world…
>
> Case in point: Madagascar's lemurs. The island is home to more than 103 types of the odd primates, all of which are unique to the country. The indri, for instance, is a panda-colored forest acrobat that catapults itself from tree to tree and screams a high-pitched wail worthy of a humpback whale…
>
> Roughly 17 million Malagasy people live and work across this same varied terrain. Their roots in both Africa and Asia mean they are a group as diverse as their surroundings. But people's impact on the land means the curious island is far from pristine. Roughly four-fifths of Madagascar's forests have been stripped bare…
>
> Thankfully, the government of Madagascar has an ambitious vision to make the country's biodiversity the foundation of the nation's wealth. CI remains a committed partner in this

process' (*Madagascar Country Profile*, Conservation International website[51]).

This is not just CI's version of Madagascar, its biodiversity and the threat to its 'national wealth', but it is rather the common, or 'canonical' (Keller 2015:2) narrative that the island evokes in contemporary global imaginaries and which makes of it a 'biodiversity hotspot'. The story is unequivocally always the same: over 80 % of Madagascar's animal and plant species are endemic; this is due its geological break from India 88 million years ago, which granted it unique and isolated scenery for species evolution; people arrived in the island around 2000 years ago and with them came major species extinction and environmental degradation, with slash-and-burn cultivation being the main culprit for the disappearance of over 80% of the forest. Conservation, or so this story runs, is needed to stop this degradation or the forests will be gone in the near future.

As one of the paragraphs above shows, the indri, that 'panda-colored forest acrobat', is central to Madagascar's fauna imaginaries. Locally known as *babakoto*, it is also the main tourist attraction in the Andasibe-Mantadia National Park (AMNP from now on), featuring on the Park's entrance sign that is situated about two kilometers from Mahatsara. In April 2013, a peculiar situation was taking place on the borders of the AMNP, where the road separates the dense, protected primary forest from the secondary vegetation or *savoka*[52], which is home to scattered villages all along the 20 or so kilometres that run between Andasibe and this northern park point. Here, tourists, unable to spot the animals inside the protected area, were crossing the road onto the side where the last patches of trees meet with the *savoka* to see the iconic primates. As I brought this anecdote up in

51 http://sp10.conservation.org/where/africa_madagascar/madagascar/Pages/default.aspx. Last accessed November 2014.

52 Savoka designates both fallow land (as we saw in the previous chapter) and secondary vegetation, which can be, but is not always, the same thing. I use it here to characterise land that has been cleared for agricultural purposes, in contrast to primary or untouched forest.

Mahatsara I was told that it was something common for this time of the year, since the *babakoto* follow the *goavy tsinahy,* or strawberry guava (*Psidium cattleianum*), which only grows on secondary vegetation. This small tree or shrub blooms with red, small, juicy fruits in the months from April until around June, and is enjoyed by adults and children alike, who pick them up as they walk by, or gather them and sell them at local markets or tourist routes.

The strawberry guava is listed as one of the '100 worst invasive alien species' in the world by the International Union on Nature Conservation, IUCN, considered a 'habitat-altering weed that poses a major threat to endemic flora by competing for light and soil nutrients' (Global Invasive Species Database 2014). The indri (*Indri indri*) also figures in an IUCN list, this time as an (endemic) endangered species (IUCN Red List of Threatened Species 2014). The fact that a *babakoto*, the main trope of conservation in Andasibe and Madagascar, may choose to leave the forest reserve to feed from a plant which only grows in secondary vegetation and is considered a 'major threat' to its habitat and itself, conveys a powerful image of the intricate, yet obscured ways in which the primary forest and *savoka*, and by extension conservation practice and *tavy*, are related. Although scientific and conservation practice insist on presenting them as opposites by invoking a natural purity (that of the primary forest), the artificiality of the dichotomy can be observed in the impossibility of controlling everyday interactions between supposedly antithetical species.

In this chapter I follow the *babakoto* in its journey to the blurry yet productive landscapes where conservation and *tavy* meet. I will show how *tavy*, while portrayed today as a threat to the primary forest—just like the strawberry guava—is in fact highly generative of value for conservation practice, and, more fundamentally, for forest carbon projects such as TAMS. The 'valorisation' of Madagascar's forests through carbon credits (turning these landscapes into 'national wealth', as CI's story above proposes), I will

argue, can only come about so long as *tavy*'s wasteful presence remains in these landscapes as a threat.

This dynamic is, however, not a recent development. In the next sections I will show how TAMS consolidates key continuities with historical processes of value extraction in the forests of Andasibe where *tavy*, while constantly left in a devalued position as wasteful and degrading practice, has actually been integral to such processes. Through the trope of 'valorisation', differently employed by the various extra-local powers that have historically operated in Andasibe, I will show how, far from the degrading practice it has always been claimed to be, *tavy* has been integrated into these forms of value production in essential ways. This, I will argue, continues to be the case in a more acute way, since particular articulations between Andasibe's past and *tavy*, and their projection into the future, are highly generative of the need and value of TAMS as a forest carbon project. Carbon, therefore, appears in this chapter as a form of value—the carbon credit—that harnesses the generative capacities of *tavy-as-waste* and reproduces historical inequalities. In this sense, it continues the conversation on articulations between carbon, waste and value that the previous chapter began.

I first take a slight detour, however, to explore the kind of environmental imaginaries that Madagascar evokes today as biodiversity hotspot, and their temporal effects. As CI's narrative above shows, the island, and its forests in particular, are portrayed as the last remnants of a pristine nature that pre-dates human disturbance, and hence recall a distant past outside of history. This, I will argue, has the effect of producing 'selective rememberings' (Coronil 1997), where the economic and political roles that these forests have played historically, and *tavy*'s entanglements with them, are effectively forgotten. By obscuring these mutual connections, this narrative contributes to the devaluation of *tavy* as a wasteful practice, at the same time as it reinforces the need for conservation.

**Madagascar, a timely place**

As the *babakoto's* taste for strawberry guava reminds us, the taxonomic classification of species into native and alien is not a straightforward process. As Helmreich (2005) shows for the case of Hawaii, biologists perceive it as a complex matter, and shifting boundaries emerge from the entanglement of diverse ideas of agency and time with political questions of native (human) populations in the island. Thus, a clear-cut nature/culture division which organises species into native and alien categories according to the absence or presence of human agency is often a complicated issue (see also Lien and Law 2011): as species introduced by early human settlement are associated with those same populations who today adopt the politically salient designation of 'natives', for example, the 'indigenous' category is problematised by recognising a particular type of human agency as legitimate within the natural sphere. Similarly, different ways among scientists of understanding Captain Cook's arrival in the island, as either a continuation of human intervention into nature, (albeit on a different, accelerated scale) or as a 'different regime of introduction' which marks the beginning of non-native species introduction, also lead to taxonomic dilemmas (Helmreich 2005:116). We can see that within these debates the question is not only one of matter 'out of place' (Douglas 1966) as in the case of 'introduced' species, but also of matter in—and out of—time, as some pasts are considered more natural than others. Specifically, it is an appeal to what are perceived as purer or more real origins and their transformation through historical time/human history, that structure these varied understandings. As has been explored elsewhere (see, for example, Lien 2007; Tsing 1995) distinctions between native and alien natural forms find potent echoes as cultural symbols through which racist and xenophobic discourses articulate ideas of nationalism, and construct 'the Other'. Again, it is an articulation between origins and purity, and therefore one which

invokes more legitimate pasts, that structures such understandings, this time in a nationalist/territorial context.

Coronil (1997) argues that there has been a tendency in Western social theory to correspond the dichotomy of nature and culture to that of space and time, whereby nature and space are seen as the 'passive material' and 'inert' space, respectively, upon which humans act and 'historical events take place' (Coronil 1997:23). Nature is to Culture as Space is to Time. The landscapes that materialise as a result of conservation practice and discourse may be seen through this perspective, as space or nature is cordoned off and preserved from human intervention, in an attempt to 'delineate and maintain a boundary in space and to arrest time in the interests of a supposedly pristine nature' (Katz 1998:54), or, in other words, through the production of a space (Lefebvre 1991) devoid of human time, or culture. Rather than focusing on the space/time dichotomy, I here want to concentrate on the production of nature through particular ideas of time.

Both Madagascar and Andasibe can be seen to gain their meaning and value in conservation practice through a very particular idea of the past. As we saw in CI's narrative above, an appeal to a pristine nature pre-dating human disturbance, '*Madagascar's geographical isolation from the rest of the continent*', is contrasted to *'people's impact on it'* (most often embodied in the practice of *tavy*) resulting in a powerful narrative which calls for and legitimises conservation as saviour of this *'national wealth'*.

Ideas of value premised on notions of a pure and native natural past, therefore, are set in opposition to all that is seen as human, post-natural and degrading. In conservation practice in Andasibe, these ideas take form through the image of the primary forest facing the *savoka*, and further materialise through spatial practices by setting borders and limits between one type of (desirable) nature and the other. These fragmented landscapes act at the same time as stage and script of a very particular story, as we saw above. Their confrontation—a pristine nature and a degraded human landscape—evokes the dual chronotope (Bakhtin 1981) of the conservation

myth: they present a particular vision of the past, and warn against its projection into the future, legitimising the teller's role as moral and necessary actor. As Roe (2005) argues, this type of narrative in which a scenario of 'what will happen if the events or positions are carried out as described' (Roe 2005:288) is an archetype of development narratives, which generally aim to foster action or acceptance among their audience[53].

The narrative thus establishes Madagascar as a unique place on earth on the basis of its natural attributes in relation to time: an island 'out of time' due to its strange and endemic fauna having followed a different evolutionary path detached from anthropogenic disturbances, or, as Sodikoff qualifies it, a 'biogeographical anachronism' (Sodikoff 2013:140). In a sense, the representation of Madagascar as an isolated and unique space separate from the rest of the world is a scalar parallel of the image conveyed by the AMNP and its suggested opposite, the *savoka* or *tavy* fields: they both represent a type of nature that is not 'of our time', but rather a fragment of what once was, and is no more. This nature appears in turn encroached by the ills of our time and points towards the future in the form of environmental degradation.

As Ferry and Limbert argue, the word 'resource' shares its etymological features with the French word source, as spring of water, and points to a 'continuous generation of something from an originary point' (Elizabeth Emma Ferry and Limbert 2008:5). Madagascar's nature in general, and Andasibe's remaining forests in particular, draw their meaning in contemporary global imaginaries from an appeal to such an original source, a kind of pre-lapsarian Nature. Their value, like that of heritage as described by Sodikoff (2012b), arises out of 'old age and rarity', understood as a 'purity' derived from an 'apparent proximity to an original source' (Sodikoff 2012b:140). Madagascar's nature, gaining meaning from its

53 For a detailed analysis of the structure of environmental narratives see Flynn 2008.

perceived belonging to an original, purer time untouched by human history, is therefore infused with the affect of nostalgia.

Boym describes nostalgia in the following terms:

> 'as a longing for a home that no longer exists or has never existed. Nostalgia is a sentiment of loss and displacement, but it is also a romance with one's own fantasy. Nostalgic love can only survive in a long-distance relationship. A cinematic image of nostalgia is a double exposure, or a superimposition of two images – of home and abroad, of past and present, of dream and everyday life' (2003:7).

We can see the double exposure which evokes this longing for the purer times of an Edenic home in the landscape of Andasibe, as the primary forest as past is contrasted with the *tavy* or savoka fields as present (and it is only through this 'double exposure' that the narrative makes sense). The imagery of Madagascar as lost Eden, or even as remnant of the fabulous old continent of Lemuria (Ramaswamy 2004), adds to the nostalgic fantasy. As Boym suggests, nostalgia is symptomatic of modernity, 'coeval' (2003:8) rather than opposed to it. If, as Frow (1997) argues, modernity has primarily to do with the break of the present from the past, its work being that to 'cut across the knot of heterogeneous strands of time to produce the stabilities and unities of a now and then' (1997:1), then the 'lament for a lost past' (1997:2) is implicit in it and leads to the production of a mythical past. The return to an imagined wilderness, so longed for in the works of Thoreau or John Muir for example, can therefore be understood as an effect of the disenchantment with the modern world (Cronon 1995).

Boym distinguishes between two types of nostalgia: restorative and reflective. The former, she argues, 'stresses nostos (home) and attempts a transhistorical reconstruction of the lost home' (2003:13). Although the idea of a return to a lost home denotes its spatiality, where nostalgia may be seen

as a longing for a place that no longer is[54], it is not so much concerned with space as such but rather with the 'yearning for a different time' (Boym 2003:8). In its restorative version, then, this space-time is to be attained through attempts to 'conquer and spatialize time' or to 'revisit time as space' in an effort to redeem longing and loss through a 'return to origins' (2003:13). From this perspective, we can see that the opposition between primary forests and *tavy*, and the aim of 'bringing back the forest' contained in TAMS as a carbon project, do not so much aim to produce a timeless nature of absolute stasis, or an island of space devoid of time (see Katz 1998), but rather act as a 'rebellion against the modern idea of time, a time of history and progress', proposing instead a 'time out of time' (Boym 2003:8): a universal, 'natural' time outside of history[55]. Contrary to an 'invention of tradition' (Hobsbawm and Ranger 1983) which aims to establish continuities with the past, this one effects a categorical discontinuity.

The nostalgic affect of this 'natural' time, which recalls 'the edenic unity of time and space before entry into history' (Boym 2003:12), has two main effects. On the one hand, by appearing as universal and outside of history, this kind of time acquires a mythical character on the basis of its timelessness. This shares similarities with the 'self-totalization' that Greenhouse (1989) claims takes place in Western conceptions of temporality and the law, and which work to turn the latter into a 'temporal myth'. An example is the principle of 'reasoning by analogy to precedent', which she argues

54 In a similar way, Cronon (1995) describes the modern longing for a return to wilderness as representing a 'flight from history', but he does so in spatial terms. Wilderness, from this perspective, can be seen as 'the original garden … a place outside of time'; 'the frontier … a savage world at the dawn of civilization'; the 'bold landscape of frontier heroism … the place of youth and childhood'; and the 'sacred sublime … the home of a God who transcends history' (1995:79).

55 A parallel take on this is Bowker's analyses on conservation biology and biodiversity valuation, where he identifies a similar 'myth', which looks, however, to the future: 'much biodiversity current discourse is concerned with rendering the present eternal- moving ourselves and our planet out of the flow of history' (Bowker 2005:112).

> 'creates a *false* historicity in that it perpetually reclaims the past for the present: in theory, a dispute from 1989 can be resolved by reference to cases from 1889 or 1389. 'The law' thus accumulates, but it never passes; at an instant, it represents a totality' (Greenhouse 1989:1640).

Both 'natural' time and the time of the law, therefore, become temporal myths by their virtue of invoking a total order which sits outside human time.

On the other hand, and by consequence, this type of temporal myth, just like the 'homogeneous empty–time' (Benjamin 1968) of the nation from where mutual origins and belonging can be imagined and eternity is invoked, is premised on, and at the same time induces to, 'specific historical amnesias' (Anderson 1991 in Coronil 1997:67). 'Selective rememberings', Coronil argues, 'mythologize a nation's past and displace conflictual aspects of its historical origins' evoking a 'sacralized conception of the nation as an eternal community' (Coronil 1997:67). This, in Venezuela, translated into an act of 'purification' (Coronil 1997:68) whereby links with the nation's past under the rule of General Juan Vicente Gomez were severed by subsequent political actors. Obscuring the fact that Gomez's rule had in effect established the pillars for the transformation of the country into a prosperous oil nation, the dictatorial rule rather served as a 'turning point' from which to construct the idea of the birth of a 'modern Venezuela' and its 'entrance into the twentieth century' (Coronil 1997:68) as an oil nation unpolluted by its past. The Venezuela that emerged was one of mythical and 'magical' properties, as 'oil wealth created the illusion that modernity could be brought to Venezuela as if pulled out of a hat' (Coronil 1997:68–69)[56].

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56 For a similar analysis on the role that temporal images play in state practice, see Grant (2001) as he explores the effects of 'timelessness' and 'arrests of time' that the infantilisation of public space had in transitional Moscow. By appealing to an innocent past, Grant argues, Tsereteli's 'Disneyfied' statues aided the state in 'buying time' (Grant 2001:352) as they distanced themselves from the context of political and economic stagnation in the capital.

We can thus see a similar act of 'selective rememberings' in the representation of the forests of Andasibe as remnants of a lost, mythical time, and therefore 'unpolluted' by the historical trajectory of the area. Myth, Barthes (1972) reminds us, is always 'constituted by the loss of historical quality of things' (1972:142), transforming 'History into Nature' (1972:140). The type of nostalgia that Madagascar invokes, therefore, is not just premised on a notion of purity (of an untouched, pristine Nature) but also performs, at the same time, an act of 'purification' (Coronil 1997:68; cf Latour 1993), presenting the forests of Andasibe outside of history: like 'modernity', far from a simple 'illusion', this 'periodizing division' is also 'an operation, it performs certain work' by making 'certain things possible' (Frow 1997:3).

Madagascar's unusual and unique natural forms, and their relation to an isolated evolutionary path, have always puzzled Western science, but their understandings have not always been the same. In the 19th century, the 'strangeness' of Madagascar's life forms, Anderson argues, were 'minimized' (2013:110) and attenuated in order to incorporate the island into global frameworks. Portrayals of unique, unfamiliar and distant lemurs, for example, were downplayed in favour of representations which emphasised their amiability and familiarity, placing the island's nature within the axis of domestication, and thus amenable to colonial control. Madagascar, from this perspective, appeared as globally connected, rather than apart. Today, Madagascar appears, once again, as an island out of time. This discourse on uniqueness, in contrast to one of familiarity and continuity, is more amenable to contemporary interventions which are premised on notions of scarcity and limited resources. If, in the 19th century, Madagascar was assembled by Western naturalists as part of a global history so that it could be brought under colonial control and 'domesticated' (Anderson 2013), today it has been set wild again. We can see here the 'periodizing division' (Frow 1997:3) at work, as the 'island out of time' is brought under environmental management.

In the following section I therefore aim to dispel amnesiac readings of Andasibe's landscape which contrast a mythical, natural time with a historical one, to see how both forests and *tavy* have been mutually entangled historically as part of wider political, economic and labour regimes. We will see how the forests of Andasibe—today depicted by conservation practice as the last remnants of a natural past—have been central to the economic and political projects of various extra-local actors over the last 200 years. What is more, although continuously portrayed as a degrading or wasteful practice, *tavy* has been fundamental to these processes of forest 'valorisation', variously understood at each historical time.

**Polluting Andasibe's pasts**

Although I briefly introduce the area before its annexation as a French colony, I focus on two snapshots at different points in the past rather than elaborating a linear, historical narrative that covers the whole period (I therefore ignore an important economic activity of Andasibe—graphite mining—which became particularly relevant from the 1930s on, and which I leave for chapter six). I present, instead, the development of logging camps and the exploitation of the forest of Analamazaotra as foundational moments of what became known as 'Andasibe' under early colonial rule, and the '*Planina dimy taona*' or 'Five year plan' during the early stages of post-colonial Madagascar. In both cases the forests of Andasibe feature as key resources within the different ideas of 'valorisation' (*mise en valeur*) that each project envisaged and called upon. I use archival and secondary data to reconstruct the colonial period, and historical accounts in Mahatsara and Andasibe for the 'Five year plan', since, as we will see, this event seems to be missing from any records. I complement the ethnographic data on the post-colonial era with the 'National Development Plan 1974-77' (Repoblika Malagasy, 1974a), accessed at the national Library in Antananarivo.

*Andasibe during the 19th century*

Andasibe-Mantadia (AMNP) is today one of the most visited National Parks in Madagascar, mainly due to its accessible location, being less than 120 km from the capital on the national road (RN2) that reaches to the eastern coast of the island. This halfway point between Antananarivo and the port of Toamasina has been one of the key elements in the development of the town and region, as stop-over between the political-economic hub of the country and one of the main commercial ports that could actualise such relations with the outside.

Although Andasibe literally means 'the big camp', in reference to the logging camps that were established in the area during the early colonial rule in the 1900s, its beginnings as a valuable and strategic point for extra-local powers can be traced back as early as the 1800s, during the time of the expansion of the Merina Kingdom[57]. At that time, it was the forest of Analamazaotra (or Alamazaotra) which encompassed the contemporary town of Andasibe and the southern part of the AMNP that was integrated into a national economy as a key military post and lodging camp in the royal expansion and trade route between the capital and the east.

Challenging the general assumption that the forest of Analamazaotra has been historically depleted by *tavy*, Campbell (2013) has offered a historical perspective on the roles that the forest played for the Merina Kingdom, arguing that the policies that were adopted by the crown between 1791 and 1861 were actually responsible for its vast deforestation. Following Merina expansion and the appropriation of cattle herds for export to Mascarene markets in the 1790s, 'cattle traders – chiefly the crown and court elite' (Campbell 2013:70) established cattle pens in Analamazaotra as a halfway point between the capital and the port, with cattle rearing leading to forest clearance of the 'western fringe of the forest' which 'disturbed

57 The Merina are the ethnic group who inhabit the highlands in and around Antananarivo and make up the bulk of the national elite.

sands and prevented normal regeneration' (Campbell 2013:70). From 1790 to 1850, wealth accumulation by the Royal Family and Merina elites, coupled with increased national power, resulted in four housing booms in Antananarivo, where most of the building materials came from eastern forests. The crown organised labour by creating 'permanent woodcutters *fanompoana* units' (Campbell 2013:81), or groups of forced, unremunerated labourers carrying out royal service. Although royal service had originated as a ritual obligation owed by subjects to their King, it had later expanded to encompass all kinds of compulsory labour required by the sovereign, from irrigation works or military service to education in mission schools (Graeber 2007:46–47), continuing well into the colonial period in various forms (explored below). With the adoption of autarkic policies in the 1820s following the failure of the Britanno-Merina treaty (aimed at promoting economic development from domestic sources), the island saw the surge of industrial production in the highlands which required great extents of wood for both fuel and production material. This, coupled with the need for firewood due to the highland's cold winters, resulted in a depletion of eastern forests almost exclusively for the imperial Merina (Campbell 2013).

The extensive use of forest resources, and its perceived fast depletion, led to policies of forest conservation coming from the crown. The eastern parts of the Analamazaotra forest may have also been protected as a defensive strategy against invasions (Campbell 2013:92). More importantly, as Betsimisaraka escaped to the forests to avoid being incorporated into the crown's forced labour and taxation schemes during the conquest of the area between 1817-1823, a number of policies (i.e. forced settlement and relocation) were introduced to limit their movement (Cole 2001:40) including a ban on the expansion of agricultural land in the forest through *tavy* (Cole 2001:41–43). The first national ban on *tavy* was instituted in 1881 (Kull 1996).

Before French occupation, therefore, Analamazaotra had already been integrated into political and economic networks that linked it to the outside,

with the forest as the key productive element and *tavy* already under regulation.

*The values of Analamazaotra for the Colony*

Analamazaotra quickly transformed with the onset of colonisation. The ancient footpath that had accommodated Merina travel between the highlands and the east during the 19th century became one of the central routes of the island under French rule. With the arrival of General Gallieni in 1896 in the role of Governor of the Colony, the eastern route—until then the most transited one—became a priority for colonial development, seen as a way of shortening travel times for troupes between the coast and Antananarivo and facilitating direct control of certain regions for colonial authorities (Razanamapisa n.d.). Until then, travel had been done generally by *filanjana*, or palanquin, with goods carried by Malagasy men, but the transit times were slow (about 20 days between Toamasina and Antananarivo[58]), expensive (1000 francs for a ton of merchandise) (Razanamapisa n.d.:5) and uncomfortable (Sodikoff 2012b:30). In 1898 'numerous *prestataires*'[59] or forced labourers were sent to fix the road between Andakana and Analamazaotra, at the same time establishing a military post in the area where three 'indigenous' operatives were appointed[60]. A 'whipsaw'[61] was set up, in turn, for the production of wood[62] and the rules of forest exploitation were presented to the indigenous population, establishing the 'exact' areas where villagers could collect

58 M. Argelies, Rapport fait au nom de la commission des colonies charge d'éxaminer le projet de loi ayant pour objet d'autoriser la colonie de Madagascar a emprunter une somme de 60 million de francs pour la construction d'un Chemin de fer de Tananarive a la Coôte Orientale et d'éxécution de travaux publics, FR ANOM 91 COL , c. 361 (Dossier 1, pg.4).

59 Rapport du Chef de Bataille Noël, Commandant Cercle Moramanaga, 1 août 1897, FR ANOM GGM 2D, c.166

60 Rapport du Capitaine Maillard sur la situation pôlitique et administrative du Cercle anneèxe de Moramanga, mai 1898, FR ANOM GGM 2D, c.166

61 A saw operated by two persons to cut timber lengthwise.

62 Rapport du Capitaine Maillard sur la situation agricole, industrielle et commerciale du Cercle annèxe de Moramanga, mai 1898, FR ANOM GGM 2D, c.166

wood[63]. Forest exploitation in the area took the form of the concession system, where colonial entrepreneurs were granted temporary forest parcels from the state for mining, agriculture or logging activities (Sodikoff 2012b:10). The main and biggest concessions in Analamazaotra and surroundings were given to 'Compagnie Coloniale de Madagascar' and 'Société de la Grand Ile'. Exploitation began mainly with a view towards producing wood for the railway system, both for tracks and firewood, and to a lesser extent for rubber production, developing the area's central economic activity during the early 1900s.

The construction of a railway that would connect the capital with the port of Toamasina, the *Tananarive-Côte Est*, or TCE, was seen as one of the most pressing issues for the development of the colony within a global capitalist system, as Gallieni himself declared in his speech during the inauguration of the TCE in November 1st, 1904:

> 'in our times of keen competition in every world market, the railway line is an unavoidable necessity, an indispensable weapon for any productive country that does not want to succumb to economic struggle nor be reduced to a deplorable inferiority' (Revue de Madagascar 1904:545; personal translation).

The TCE railway was expected to become the motor of rice exports from the highlands (Gallieni baptised it as 'the railway of rice' in reference to the 'railway of peanuts' in Cayor, Senegal) and to a lesser extent wood from Betsimisaraka forests (Revue de Madagascar 1904:546–547). Indeed, in 1906, the General Guard of Water and Forests Lhotelian informed in a report to Gallieni that, thanks to the railway system, wood exports would soon take off, as '*concessionaires*' were setting up a market in South Africa,

63 Rapport du Capitaine Maillard sur la situation agricole, industrielle et commerciale du Cercle annèxe de Moramanga, aout 1898, FR ANOM GGM 2D, c.166

where the 'Compagine Coloniale' had already sent samples of tracks from Analamazaotra to the Transvaal[64].

But the role of the TCE was not just economic. Gallieni's inauguration speech emphasised the civilising task that the Antananarivo-Toamasina link would effect by enhancing Merina-Côtier (Coastal) relationships, considering it an educational, humanitarian responsibility for the colony and a basis of progress (Revue de Madagascar 1904:542). In the mistaken hope that the colony would favour the end of Merina domination over coastal peoples, Gallieni concluded in his speech that

> 'thanks to the railway, Tananarive and Tamatave will be able to shake hands, which will be … a medium for expansion and education of the indigenous population and, therefore, an element of development and progress for the colony itself' (Revue de Madagascar 1904:544; personal translation).

In 1902 a station was set up a few kilometres from Analamazaotra, where the contemporary town of Andasibe is. It was named Périnet after the engineer in charge of that section and who, arriving in a preliminary mission led by General Roques in 1897, had died during building works. The old pathway and carrousel route, the development of the railway and the centrality of the station of Périnet facilitated the exploitation of the forest of Analamazaotra over the coming decades. Thus, the forest became an instrumental resource for the development of the colony.

64 Le Garde General des Eaux et Forêts Lhotelain in Rapport de Tournée de Garde des Eaux et Forêts 1906, FR ANOM GGM 5 D (18), 1

*Travaux du chemin de fer près d' Andasibe Analamazaotra (1903)*

**Figure 9. Railway works near Andasibe Analamazaotra, 1903. Source: Madagascar's Geographical Institute, FTM (*Foiben-taosarintanin'i Madagasikara*)**

Wood was not, however, the only thing that Analamazaotra had to offer to colonial Madagascar. As Feeley-Harnik (1991) has argued, the scarce resource for the colonial state was always labour, not land. The shortage of labour has indeed been cited as one of the key problems that colonial rule encountered in Madagascar (Sodikoff 2004; 2012b), and often featured as the main preoccupation (along with *impôts* or taxes) for the administration in the yearly, regional reports for the province of Moramanga[65].

The system of '*prestataires*' provided much of the labour force needed in the early days of the colony. Although '*fanompoana*' was banned as early as 1901, forced work continued in both open as well as surreptitious ways. It would eventually be institutionalised in the 1920s in the SMOTIG programme—*Service de la Main-d'Oeuvre de Travaux d'Interêt Générale*—which employed conscripts for 2 years to carry out public works, who could also be 'borrowed' by 'private industrialists' (Sodikoff 2012b:51). The need

65 Rapport Pôlitique et Administrative, Moramanga FR ANOM GGM 2D, c. 167

to enlist Malagasy workers for both public and private enterprises, who, however, refused to become wage labourers and fled to the forests, led to a constant tension between the administration's 'desire to distance itself' (Sodikoff 2012b:63) from f*anompoana* and the pragmatics of finding available workers.

The lack of workers for the construction of the TCE was initially tackled by bringing in a foreign labour force. With Malagasy populations deserting their jobs, countless efforts were made to introduce foreign workers—from India and China especially, but also Italian and Greek—but with no success, as they either deserted or died *en masse* due to the harsh working conditions (Razanamapisa n.d.:12–14).

The ban on labour requisition from 1901 had been replaced by a personal tax, which effectively translated into a requirement of 30 to 40 days of 'free' work to pay it off. Razanamapisa (n.d.:13) argues that this, along with a strong propagandistic initiative and a cricket invasion in the eastern area in 1901, led to the enlistment of many locals at the work sites. It seems, therefore, that the construction of the TCE was carried out through mixed forms of free and corveé labour. The Dossier Algiers from 1898[66], for example, suggests that Betsimisaraka populations carried out 30 days of forced work for the TCE but could, after that period, remain in the work sites as free workers for 75 cents a day, plus daily food rations. It seems that populations may have taken advantage of this system, as numbers of workers in Analamazaotra reflect drastic seasonal fluctuations. Thus, in the beginning of 1902 there were around 250 workers in the sites of Analamazaotra increasing up to 4000 towards the end of the year. During the agricultural season (December to May), numbers fell radically, with only 500 workers in May 1903, to later increase again (Revue de Madagascar

66 M. Argelies, Rapport fait au nom de la commission des colonies charge d'examiner le projet de loi ayant pour objet d'autoriser la colonie de Madagascar a emprunter une somme de 60 million de francs pour la construction d'un Chemin de fer de Tananarive a la Cote Orientale et d'exécution de travaux publics, FR ANOM 91 COL , c. 361 (Dossier 1, pg. 32).

1904:527–528). As Cole has argued, the shortage of labour also transformed into a permanent tension between private colons' need for workers and that of the state (2001:50).

We have therefore seen how the forest of Analamazaotra and its inhabitants were integrated into the colony's project of 'valorising' (*mise en valeur*) Madagascar. But how was *tavy* perceived and dealt with in this context? The administration's efforts to eradicate *tavy* had the double aim of halting deforestation and integrating Betsimisaraka farmers into wage labour. As Sodikoff has shown (2012b; 2004), the vilified agricultural practice was perceived as a waste of both land *and* time, and it was hoped that wage work would instil a capitalist 'time-discipline' beneficial for both forests and the 'indolent' (Sodikoff 2012b:58) natives. At other times, however, *tavy* was depicted as a necessary evil.

We can appreciate a similar approach to *tavy* in an early report on the 'provisional management' of the 'Analamazaotra Forest Station' from 1909, carried out by Modeste Louvel (1909), Head of the Forestry Section of the General Government in Madagascar. The Forest Station had its origins in a 'Tree Testing and Nursery Station', (*Station d'Essai et Pepiniere*), from 1900, established with the aim of carrying out research for both 'exploitation' and 'regeneration', although the latter objective was soon eclipsed by the more pressing needs of obtaining wood for the railway. In 1904, colonial inspector Thiry established it as 'Station Forestier d'Analamazaotra', becoming a key enclave for the processing and production of timber and, to a lesser extent, as a scientific site for the study of Malagasy flora and fauna. Louvel's report from 1909 is basically an inventory of timber species to be used in the exploitation of the area, divided into parcels and granted to the two main forest 'concessionaires', 'Societe La Grande Isle' and 'Compagnie Coloniale'. When commenting on the eastern side of the forest, Louvel claims that 'each year Betsimisaraka burn the forest to establish their *tavy*, destroying beautiful wooded parts'. As a result, it appears that *tavy* had been limited to the *savoka*, 'land covered with brushwood or parts already burnt for past

cultivation', in the hope that this would 'force them [Betsimisaraka] to cultivate the marshes' (1909:314), that is, to turn to irrigated agriculture.

Although Louvel's report from 1909 identified *tavy* as the main driver of deforestation, a report of 1916 from the Governor of Moramanga[67] quotes Louvel in bringing attention to the 'abusive exploitation from both big concessionaires and of the natives, who cause the forests of the Colony very important damages'. By 1929, the Forestry Service requested a moratorium of 15 years in all concessions, acknowledging the disastrous effects that logging was having on the island's forests, and arguing for central, public management of the TCE logging activities[68]. The tensions between commercial exploitation and the need to conserve forests had become evident, and it is no coincidence that around the same time that the logging industry in Périnet was transferred to the state for more 'rational' management[69], the first network of protected areas was established in the island. More revealing, however, is that fact that three years later, in 1930, a new national regulation of forests was passed, where *tavy* was explicitly banned (Raik 2007:7).

We can begin to see how the forests of Andasibe played a central role in the initial stages of the colony (as well as the pre-colonial expansion of the Merina Kingdom) as the area became a productive hub of timber and drew on local labour for its extraction and the development of the railway—a colonial priority as Gallieni himself declared. *Tavy*, on the other hand, was treated as a degrading practice that endangered the value that the forest of Analamazaotra held for the colony, leading to the establishment of limits to the agricultural practice. This, as I now show, became a dynamic that continued into the post-colonial period, although the value of the forests and the state's approach to *tavy* took different forms.

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67 Rapport Economique Moramanga, FR ANOM GGM 2 D, c. 168

68 Rapport général sur le fonctionnement du service forestier en 1930, p 10, FR ANOM GGM 5 D (18), 15

69 Ibid

*The 'Five year plan'*

Although Madagascar obtained its independence from France in 1960, it was only in 1975 that colonial ties were truly severed, as a result of the student-led May revolution of 1972 and the instauration of the Second Republic with Lieutenant Commander Didier Ratsiraka as President. In the context of a total break with the *mêtropole*, Ratsiraka embarked on a Marxist-inspired isolationist era, which has been usually portrayed as one of continuous decline in the country's economic conditions (Gow 1997) lasting until the mid 1980s, when Madagascar re-opened to the outside and became the first ever African Socialist State to agree to structural adjustment policies by the IMF.

Ratsiraka's socialist project envisaged the devolution of powers to 'the people' through a re-dynamisation of the Fokonolona/Fokon'olona (Gow 1997): a village assembly where people gather to deliberate on any local matter of concern, 'regardless of descent' (Graeber 2007:69), and which is sometimes equated with an organisational institution[70]. Economic policies were based on domestic production for self-sufficiency, with nationalisation and large-scale development projects implemented through a politics of investment based on debt (Gow 1997). In this context, the country's economy began to decline at a tremendous pace and in rural areas this was felt through the retreat of the state, which practically disappeared (see Graeber 2007).

With regards to forestry and conservation, this era is usually portrayed as a time when state anti-fire repression was 'intensified', 'marked by increasingly harsh approaches to fire enforcement' (Kull 2004:236). Various rulings were introduced in the years between 1972 and 1977 strengthening fire prosecution by speeding up judicial procedures, raising prison sentences and even placing illegal fires 'under the jurisdiction of the *Tribunal Criminel Special*, which could theoretically give the death sentence'

70 For a discussion on different understandings of f*okon'olona* see Graeber (2007).

(Kull 2004:236). This centralised, strict approach to forest fires contrasts sharply with the devolution of local powers and the retreat of the state in rural parts of Madagascar, being usually understood that, in any case, Ratsiraka's authoritarian endeavours were never very successful due to their difficulty of implementation. Although it would seem that many efforts went into limiting *tavy* at the central level, it has also been said that during the early rule of Ratsiraka controls on *tavy* were loosened in the interests of national development and food security (Christian Kull, personal communication, October 2012).

These unresolved tensions between central and local power structures, coupled with the need to increase domestic rice production, may account for the radically different narratives regarding forestry and *tavy* found between national policy and local life histories in Andasibe/Mahatsara.

Indeed, this vision of state fire repression between 1975 until the early 1980s, which would have meant important hardships for *tavy* farmers, is nowhere reflected in Mahatsara or Andasibe's understandings of the era. Instead, and very surprisingly, these years are remembered as benevolent and prosperous, when farmers were allowed to practise as much *tavy* as they wanted thanks to Ratsiraka's 'Five year plan', or *Planina dimy taona*. In fact, during fieldwork, any conversation with people over 45 years of age that dealt with the practice of *tavy* in the past would unequivocally bring up the 'Five year plan' during the 'days of Ratsiraka' (*tamin'ny andron'i Ratsiraka*).

Very little has been written about those immediate years in which repression on fire was relaxed (the 'Five year plan' is mentioned in Rakotondrazafy 2007), and nothing, to my knowledge, on the forms they took or effect they had at local level. The apparent lack or insignificance of this period in the literature, and among current conservation or administrative actors in the capital, sharply contrasts with its relevance in the local area. Although its name may be a general reference to the fact that

state programmes were operationalised in five-year blocs, local people in Andasibe/Mahatsara, as I will show below, specifically locate it as part of the national programme for food self-sufficiency, coming directly from central government. Whether one or the other, the fact is that the 'Five year plan' had a real and important impact in Andasibe, proof of which is the fact that it has remained inscribed in people's imaginaries of the past with strong nostalgic tints[71].

In Mahatsara, for example, the plan is unequivocally remembered as a better time, when people were allowed to practise as much *tavy* as they wanted[72], provided they obtained authorisations from the forestry services through permits that were renewable at the end of each 5 years. Maman'i Jo, for example, has been living in Mahatsara since 2001, when she and her family 'were moved' from their previous home inside the Park (a few kilometres from Mahatsara) as a result of the area having been taken over by the World Bank, *lasan'ny Banque Mondiale ny toerana tany dia nafindranjareo niainga aty izahay*. She came with her husband, who later died, and now lives with her granddaughter Lala, surrounded by daughters and sons. In her fifties, her slender body and soft voice confer a frail appearance, which is nonetheless quickly dispelled as she recounts her comings and goings with Lala in search of gold. She holds a parcel of *tavy* not too far from Mahatsara, which in any case she deems to be insufficient. In the past, she says, there was much more land available, especially during the 'Five year plan', 'but when we got here it [the five year plan] was already over … so we haven't got much land these days'.

*Tavy* during this time is remembered as unrestricted and 'with no limits'—as Maman'i Jo explained, 'there were really no limits (*tsy nisy fametrarana*), you just did [*tavy*] as much as you wanted—and it evokes memories of opulence, as when taxi-brousses (local buses) would be sent

71 Interestingly, it also became a form of land securitisation since, in theory, farmers could claim ownership to the land they had cleared for cultivation.

72 I explore the significance of the 'Five year plan' in ideas of expansion/oppression and the role of the state for people in Mahatsara in chapter five.

into Mormanaga (the regional capital) full of produce to be sold, and full of goods brought back from there, as recounted by another elder from Mahatsara.

Ideas of the 'Five year plan' are not restricted to Mahatsara, but form part of the local imaginary in Andasibe. In one of our many talks over a beer at the local bar in Andasibe, my friend and informant Jean Noel, local park guide and president of the Association Mitsinjo[73] during 2013, retold how his father cleared and acquired great extensions of land through the 'Five year plan' during the 1980s, as did every villager in Andasibe, with terrible consequences for the local environment for which Jean Noel so strenuously works.

In turn, local figures of authority, such as Andasibe's Mayor, Mr. Abdoul Kader, and his senior assistant Roland, narrated the 'Five year plan' as a programme of national reach, which was part of the Socialist government's plan of securing rice self-sufficiency, '*tao anatin'ilay hoe fahavitan-tena ara-tsakafo*', and without any doubt part of central government directives. The lack of documentation was explained by the Mayor as due to the probable fact that it was 'something launched just verbally', '*zavatra lancena verbal fotsiny, ilay i*zy'. Roland, in turn, elaborated:

> 'It was done within the food self-sufficiency plan. There were no decrees, but that was it. It was the Eastern area of the island (*faritra antsinanana*) that benefited from it mostly … it was for people who had no land … Those at the Head of Triage, at the Forestry Service, would have a look at the land and share it according to the rules for those requesting it. And after five years you could claim land again. But here it was them at the service of Water and Forests themselves who did it'.

73 One of TAMS' Facilitating Agents or FAs.

The discourse found in Mahatsara regarding the benevolence of the plan in terms of it imposing 'no limits' turns, in the Mayor's words, into one which emphasises its 'uncontrollable' character (*tsy voafehy*), where the practice of *tavy* during this time is seen as the main cause of deforestation in the area.

The significance and pervasiveness of the 'Five year plan' in people's memories and imaginaries regarding *tavy* in Andasibe and Mahatsara contrasts sharply with its insubstantiality in national offices, marked by a lack of awareness on what the plan was or what it involved. At best, people from regional or national organisations operating in Andasibe had sometimes heard references to it, as was the case of CI's technical advisor for TAMS—but often held no real knowledge of what it had entailed. The Director of the National Land Programme (PNF) based in Antananarivo, for example, had not heard anything about what it was and could only speculate that it may have had to do with local power holders or politicians allowing and encouraging *tavy* in the shadow of the central government to advance and secure their powerful positions.

The 'Five year plan' as it was operationalised in Andasibe is indeed a puzzle when it comes to national policy: I have not been able to find any decrees, laws, rulings or documents on the 'Five year plan' myself in Antananarivo's archives. Having left no apparent traces, it seems that the Plan has been forgotten in time. An entry on the 'National Development Plan' (Repoblika Malagasy, 1974a) published by the Malagasy Republic for the years 1974-77, offers the most solid direction in speculating about the plan and its relation to national rice self-sufficiency.

This document is a compilation of the Marxist-inspired speeches and writings by Gabriel Ramanantsoa as Head of General Government (he was Prime Minister from 1972-1975), setting the framework for the general idea(l) of development for the Socialist government. In his programme speech from 1972 he states that it is 'imperative to increase and valorise production by mobilising not just monetary resources available but also, and

especially, rationally using the capital-labour that our population enjoys' (Repoblika Malagasy, 1974b:ix). Agriculture is thus identified as the base of the economy, and the intensification of rice cultivation for self-sufficiency as a motor of development, something which is to be attained within the next five years:

> 'During the next 5 years, around 20 billion (Malagasy francs) will be consecrated to the production of paddy … In quantitative terms, the main objective will be to eliminate all rice imports at the end of the 5 year period … In the current period, the State, acting at the same levels as other producers, will deal directly with the production, it being understood that the new surfaces could be either allocated to farmers or the Fokonolona, in order to valorise them [*mettre en valeur*] following the provisions of the bill of specifications, or be cultivated under governmental rule' (Repoblika Malagasy, 1974a:63–64).

Although conservation efforts were also encouraged in parallel in order to protect national resources, it would seem that the priority of guaranteeing food self-sufficiency overrode them. A note by the 'Direction of Water and Forests and Soils Conservation' published in the midst of the independence revolution in 1973, in fact, states that 'without abandoning its traditional role of protection and conservation, the Forestry Service is currently oriented towards more dynamic conceptions of development' (Ramanantsoavina 1973:34).

It is at this intersection, I argue, that the 'Five year plan' may best be located, as a strategy to attain the 'valorisation' of Andasibe's forests within the national development plan of rice self-sufficiency. This era would only last 10 years, coming to an end as Madagascar opened up to the outside and engaged with international institutions like the International Monetary

Fund and the World Bank in the 1980s, marking the beginning of contemporary forms of conservation programmes. The targeting of Madagascar as environmental hotspot escalated over the coming decade, culminating in 2003, as the then president Marc Ravalomanana pledged to triple the island's protected areas in the World National Park Congress in Durban. The days of the 'Five year plan' were long over, and it is this moment that Mahatsara residents identify with strict and arduous *tavy* controls. From this perspective, the 'Five year plan' does not appear as just a loosening of control over *tavy*, but rather as an intentional move (either national or regional) to integrate the agricultural practice into the Socialist programme for national development as a value-generating activity.

*'Valorising' Madagascar through tavy*

In the previous sections I have shown two moments in the history of Andasibe when its forests were incorporated into each era's project of national/colonial development (along with a brief overview of pre-colonial times, when the forest of Analamazaotra served the expansion of the Merina Kingdom as a defensive and industrial resource).

Valorisation, or '*mise/mettre en valeur*', during these two eras appears as a productive trope in idea(l)s of development, referring to the different forms of integrating certain elements into productive processes. As Sodikoff explains, during the colonial era 'valorisation' referred to 'bringing land under capitalist production' (Sodikoff 2012b:5), a process we have seen took the form of forest exploitation in Andasibe for the construction of the railway (as driver of the colony's political and economic development), and for wood exports. In the post-colonial state, as explored above, it referred to the exploitation of land for rice cultivation in order to attain the socialist-isolationist ideal of self-sufficiency. In both cases, as we have seen, then, the forests of Andasibe were pivotal for the island's development, as were its inhabitants as a source of labour. Far from remnants of a natural time outside of history, we have seen how these supposedly pristine landscapes

have been at the centre of the various state-making projects in the island over the last two centuries.

The trope of 'valorisation' is also productive in exploring ideas of perceived waste or non-value. In both cases presented above the idea of 'valorisation' also entailed the relegation of *tavy* to a residual place as a wasteful and degrading practice, through bans and persecution exerted by both regimes. Even if during the 'Five year plan' *tavy* was acknowledged as value-producing, it was also criminalised through central government, in an interplay between the tensions of conservation and rice production. Although contemporary efforts at forest 'valorisation' in Andasibe (through TAMS and conservation) take a significantly different form, this approach to *tavy,* as we saw in the previous chapter, remains.

A closer look, however, reveals that although continuously left in a devalued position*, tavy* has actually been integral to these 'valorising' projects historically, and continues to be so today. From the expansion of the Merina Kingdom, *tavy* was treated by ruling elites as a wasteful practice and an obstacle in the recruitment of labour for national development, and was consequently regulated or banned. At the same time, however, its persecution was erratic and strategically relaxed at times[74]. Although the Merina Kingdom established bans on *tavy* to curtail autonomy and movement, for example, these were at times relaxed in order to secure a source of soldiers who were not attached to permanent agricultural fields, which would 'hinder their mobilization' (McConnell 2002:221). This extends to the use of local '*fanompoana* units', or the provision of free labour through Royal tax service in the forest of Analamazaotra, where labourers were most likely dependent on their own means—and thus *tavy*—to sustain themselves. The same process was mirrored in colonial policies since the

74 An erratic yet enduring persecution of *tavy* has historically shortened fallow periods, decreasing soil fertility in fixed settlements and forcing farmers to expand deeper into the forest in search of fertile land, either in search of a livelihood or to escape work or slavery. We can therefore see how, in a sense, the simultaneous degradation of landscapes and livelihoods by extra-local powers and their historical persecution of subsistence agriculture has favoured, rather than decreased, the expansion of *tavy*.

use of 'free labour' by the colonial state in public works and concessions, which was sometimes also 'borrowed' by entrepreneurs (Sodikoff 2009:446), entailed farmers' dependency on their kin for subsistence and, consequently, maintained them as intrinsically attached to *tavy*[75]. Thus, rather than severing farmers from their social and economic relationships with *tavy*, policies that aimed to incorporate labourers into their own productive processes and eradicate *tavy* also depended on its very reproduction (Sodikoff 2009). Paradoxically, *tavy* became the one agricultural system that supported peasants' subsistence, thus guaranteeing the constant supply of cheap or free labour that ruling powers needed. Betsimisaraka landscapes, therefore, became instrumental in the state's capacity to enact its policies as *tavy* was made symbiotic with forest and peasant exploitation. The 'Five year plan', therefore, can be seen as a visible instance of the more general trend in the forests of Andasibe where *tavy* became an integral element in 'valorising' the island's forests.

But how does this play out in today's conservation and carbon economies, where *tavy* is, once again, squarely situated as the antithesis of both ecological and economic value, as we saw in the previous chapter?

## Conservation, Labour and the Value of Loss

The progressive preponderance of conservation in Madagascar's development policies until today seems to be antithetical to such a pattern of value extraction and consequent reproduction of *tavy*. Conservation has generally been seen as non-productive, 'the antithesis of human productive activity' (Smith 1990:368; Sodikoff 2012b:7), and *tavy*, from this perspective, appears as its antagonist, seen as the epitome of wasteful production.

75 It is essential to note that this was not solely an effect of colonial labour regimes, but, most likely, farmers who were employed by the colony also purposefully maintained their attachment to *tavy*, both for economic and symbolical reasons (see Jarosz 1996).

Even when considered as a mode of production (Brockington and Scholfield 2010; Garland 2008), conservation has been differentiated from extractive modes of exploitation, its value generating capacity associated generally with the symbolic capital it generates, and often seen as non-consumptive. A reflection of this, as Sodikoff argues (2009; 2012b), is that the question of labour has been largely ignored in the conservation literature which has always been premised on the 'parks vs. people' dichotomy (Sodikoff 2012b:6), usually seen as one of conservation vs. production (see Garland 2008 for an exception). Even recent analyses that focus on contemporary forms of conservation as novel sites for the production of capitalist value, tend to adopt the 'parks vs. people' discourse and overlook instances of labour at the specific locales of conservation. Thus, it is interesting that 'Towards a Synthesized Critique of Neoliberal Biodiversity Conservation' by Büscher et al. (2012) does not contain any references to regimes of labour in conservation sites, where local populations only feature as affected by displacement and enclosure (Büscher et al. 2012:21). Here, as well as in similar works by the same authors, where conservation appears as 'spectacle' (Igoe 2010) or as productive of 'derivative natures' (Büscher 2010), the realm of production seems to be located in commodified representations of nature (Büscher and Igoe 2013:258), capitalist value arising 'through mass production, distribution and consumption of modern and replicable forms of representation' (Büscher et al. 2012:14). The neglect of local labour in conservation activities is particularly evident in the adoption of the term 'prosumption' (see Ritzer and Jurgenson 2010) by Büscher and Igoe to refer to the 'blurring of production and consumption' (2013:286) in biodiversity conservation. Identifying consumers' response to mediated images of nature in interactive web 2.0 applications as a form of 'value-producing labour', (such as starting up a website to save a particular animal), they effectively transfer the sphere of production to the (First World) consumer herself. When they turn to the 'material realities' (Büscher and Igoe 2013:291) in

conservation sites, in turn, locals appear as the targets of evictions or failed development projects, but not as part of the value production process.

Sodikoff's (2009; 2012b) fine ethnography of labour relations in conservation departs from this approach by focusing on what she terms 'subaltern labor', or 'the people at the lowest levels of the social hierarchy in Madagascar' (Sodikoff 2012b:7) employed to carry out manual work in the UNESCO Mananara-Nord Biosphere Reserve, in North-east Madagascar. Her analysis of the division of labour in the reserve reveals a picture in which local, uneducated, peasant Betsimisaraka manual employees are relegated to low-wage work (in contrast to the 'intellectual' labour of Merina and European employees), with salaries that can hardly provide for their basic needs. Their work involves activities that help sustain the park and aim to legitimise it among their own communities. Through various manual tasks, dissemination work and, most controversially, the eviction of local illegal occupants, park rangers add value to the reserve. Their low wages, however, mean that they can never break away from subsistence agriculture and, consequently, they remain entangled in the economic and social relationships of *tavy*. The paradox is clear: low-wage manual workers are asked to cultivate an environmentalist spirit and add value to the same fields they are constrained to consume as *tavy* farmers. As has been the case historically, the provision of cheap labour from which this new form of production gains value ends up perpetuating *tavy*, albeit in a marginal position, thus reproducing unequal power structures.

There is, however, a further intricacy to the interrelation between conservation, wage work, *tavy*, and value. If considered as a mode of production, conservation appears to gain its value partly from its symbolic capital as a scarce resource, as the imagery of the 'lost Eden' imbued with the nostalgic affects described above travels through global media and is translated into revenue. As Sodikoff claims 'biodiversity alone does not attract aid in the way *scarce* biodiversity does' (Sodikoff 2005:269). This could not be more relevant to Madagascar, a country which has accrued its

meaningful position in the global environmental imaginary as 'hotspot' due to its endemic—*and endangered*—flora and fauna. As we have seen, the Edenic narratives that characterise the island based on ideals of a pristine past appeal to an *intrinsic value* of nature premised on a temporal interpretation of socio-natural relationships, where 'time is running out' (Sodikoff 2012b:68) and extinction looms as a result of *tavy*. In this sense, it is the *threat* posed by *tavy* that partly adds value to the conservationist mode of production in Madagascar's post-colonial political economy. Betsimisaraka park rangers, then, embody the dialectic between conservation and *tavy*, as their labour processes—as park rangers and *tavy* farmers—add value to rainforests by both protecting and degrading them. This dynamic results in a 'redeployment of a historical moral hierarchy' (Sodikoff 2012b:9) as Betsimisaraka are partly integrated into exploitative labour relations while relegated to marginal positions, at the same time reproducing the need for intervention.

I suggest that the carbon of forest carbon projects, as a form of value with a logic of its own, represents a further step in the internal relations of conservation and *tavy*, as it reproduces this dialectic in a more acute and essential way.

In TAMS as a carbon project, exploitative relations can be observed in the failure to deliver the much awaited 'benefits' that farmers were promised as they gave land for the project, or even in their framing by the project as recipients of 'development' instead of carbon credit owners (as explored in the previous chapter). As in Sodikoff's example, in turn, a clear and strict ethnic hierarchy—Euro-American/Merina/Betsimisaraka—operated in the project.

But the production of value in TAMS as a forest carbon project does not stop at this point. We have seen how conservation gains part of its value through an appeal to nature's intrinsic worth and its potential destruction through *tavy*. This type of 'symbolic' value is only partially generative of capital since parks are not fully integrated into commodity circuits. Carbon

trading, on the other hand, conflates the intrinsic value of nature as endangered with its economic value as scarce resource in a system of production and exchange. The very internalisation of nature *is* the process through which a system of supply and demand is established on the basis of scarcity. As Sahlins argued,

> 'The market-industrial system institutes scarcity, in a manner completely without parallel. Where production and distribution are arranged through the behaviour of prices, and all livelihoods depend on getting and spending, insufficiency of material means becomes the explicit, calculable starting point of all economic activity' (1972:4).

The careful management of scarcity, as Harvey has argued, 'is in fact necessary to the survival of the capitalist mode of production' (Harvey 1974:272; see also Verdery 1996:42; and Mitchell 2011 for the centrality of the management of scarcity in the oil economy). In the carbon marketplace, part of this scarcity is instituted through the 'cap' system: as emissions reductions are established, limited pollution permits are allocated so that trading can take place. In the case of offsets, on the other hand, it is the *threat* of scarcity in the future that generates carbon credits—and thus value. It is essential to remember, as I argued in the previous chapter, that what an offset project is supposed to produce is not CO2 per se, but rather Certified Emissions Reductions or CERs. The already introduced concepts of 'additionality' and 'baseline' scenario (as part of what I termed 'constitutive elements' of a CDM project in chapter three) are essential to understand how scarcity is produced. On the one hand, projects need to demonstrate that they are additional—that is, that emissions reductions would not have happened without the project's activities, or, what is the same, that deforestation would have taken place in the absence of the project. On the other hand, the number of offsets obtained (measured in tons of CO2

equivalents, *tCO2e*), must be calculated against a baseline, a mean projection of the past 15 years or so of deforestation trends into the future, and therefore a conflation between the past (variously represented and calculated) and an imagined future. These two elements construct what Lohmann (2005) terms a 'counterfactual scenario': a singular, imagined situation of the future from which expert calculations—and therefore carbon value—can follow. In order to calculate, and hence, generate, reductions, a source of emissions—in this case *tavy*—first needs to be established as the only possible future reality in the absence of the project. CERs, and therefore value in forest carbon projects, arise out of an instituted system of *imagined* future scarcity embodied in the counter-factual scenario[76], which, in turn, makes the project 'additional'. It is not surprising, in fact, as Leach and Scoones (2015) have argued, that singular, simplistic, and often mistaken narratives of slash-and-burn agriculture have seen a comeback in landscapes across Africa targeted by forests carbon projects. 'Forest carbon project discourses', they argue, 'have strikingly brought 'the slash and burn farmer' back to life, re-imagined as the key villain responsible for forest loss and threat' (2015:17). The threat of loss and waste, as I argue below, is thus essential to the production of carbon value.

This type of value production parallels with the 'value of loss' described by Hayden (2003) for bio-prospecting agreements in Mexico. Just as in this case, bio-prospecting generates value in the present—funds for research, for cataloguing, for patenting, etc.—from 'an idiom of future loss' (Hayden 2003:57), which invokes the possibility of missing out on economic returns as plants and their genetic information disappear. As with carbon offsets, it is a value which can 'only be imagined' (Hayden 2003:57), as the present is contrasted to a future determined by resource depletion. In both

76 For the case of REDD, 'Reduced Emissions from Deforestation and Degradation', this form of value production is cunningly encompassed in its very definition: 'avoided deforestation' represents the generative capacity of deforestation, because with nothing to avoid, offsets cannot be generated.

cases, then, value emerges from a threat which need not be strictly real: the greater the threat—or what is the same, the greater the imagined future scarcity—the greater its value in the present. In a similar vein, Weszkalnys (2014), following Agamben (1999), employs the notion of 'the presence of an absence' to refer to the negative or 'disastrous potential' (Weszkalnys 2014:213) of oil in Santo Tome Principe, where the anticipation of a 'resource curse' is productive of a particular kind of temporal politics in the present. Therefore, as the country engages in prospective oil explorations, it also anticipates the economic and political disaster associated with resource booms, in turn generating 'new entities, organizational forms and subjectivities' (Weszkalnys 2014:213). The 'National Petroleum Agency', for example, funded by the World Bank, has been set up to oversee government policy in the oil sector and to ensure 'good governance and transparency' (Weszkalnys 2014:218) so that disastrous experiences of oil exploitation elsewhere—and the failure to turn oil into economic prosperity—can be avoided in the future. The temporality of the 'not yet' (Weszkalnys 2014), constituted by an imagined absence in the future, becomes generative in the present.

In all cases, resources of this type, whether genetic material as information, the benefits of oil, or CERs in forest carbon projects, derive their generativity in the present through their imagined absence (or scarcity) in the future. As the forests of Andasibe are integrated into carbon generating projects, *tavy*, while maintaining its historical position as a 'degrading' practice to be eliminated, acquires a re-vitalised generativity by providing the counter-factual scenario through which scarcity is constructed and additionality is justified. Carbon credits can only come about through *tavy*'s threat of waste and loss.

## Conclusion

I began this chapter exploring how contemporary temporal constructions of Madagascar as an 'island out of time' have imbued it with the affect of nostalgia (Boym 2003). This, I argued, has led to very 'selective rememberings' (Coronil 1997:67) in Andasibe where the economic and political roles that its forests have played historically, and *tavy's* entanglements with them, tend to be forgotten. Rather than the last remnants of a natural, ahistorical past, we saw how these landscapes had been central to the economic and political projects of various extra-local actors over the last 200 years, and *tavy*, marginalised as a degrading and wasteful practice, had in fact been highly constitutive of value. Carbon credits, while usually presented as a radically new form of forest 'valorisation', only heightened these dynamics, since, as I argued, their value generating capacity is fundamentally animated by the threat of *tavy*. Like in the case of the *babakoto* and the *goavy tsinahy*, the relationships between *tavy* and carbon in Andasibe are much more complicated and entwined than is usually made to appear.

Over the last two chapters I have explored the social life of carbon in its credit form and its entanglements with questions of value and waste as it was put to work in the landscapes of Andasibe. In chapter three we saw that carbon credits, as a form of value with a logic of its own, proposed a future of absolute ecological and economic value in Andasibe's forests where any past, present or future trace of *tavy* as waste had to be negated. In this chapter, by contrast, we have seen that, while relegated to a degrading and degraded position, particular articulations between Andasibe's past and *tavy*, and their projection into the future, are generative of the need and value of carbon credits. We can therefore see how carbon credits, as a specific form of value, are not only premised on the absence of *tavy*, but also, and fundamentally, on its absent presence.

Tsing (2005) has argued that global finance, as speculative enterprise, must 'conjure' the possibility of profit before it can be realised or 'extracted'. This often takes the form of a 'dramatic performance', since 'the

more spectacular the conjuring, the more possible an investment frenzy' (Tsing 2005:57). From this perspective, it is easy to see why the BBC video I presented earlier to introduce chapters three and four showed the image of a burning hill in the forest of Analamazaotra while claiming that carbon credits could generate 50 million dollars within the next five years in Madagascar. *Tavy* provides the 'drama' that carbon credits need in order to 'conjure' their potential, and, as we have seen in this chapter, to come into being.

In chapter eight I will come back to issues of waste and value in forest carbon projects by focusing on the specific temporal politics they articulate, some of which we have already begun to see. I now leave the carbon credit behind and move on to other social lives of this multiple object.

# Part II: Introduction to Chapters Five and Six

In 2013 The Makira Forest REDD+ Project in northeast Madagascar, managed by the Wildlife Conservation Society (WCS), became the first ever African project to put 'Government-backed' and 'verified' offsets for sale on the voluntary market, with 32 million tons of carbon predicted to be stored in the forest over thirty years, and over 700,000 carbon credits thus produced (WCS 2013). While portrayed as one of the first REDD+ success stories in the continent, its history has not been without controversy. Back in 2008, around the same time as WCS, in partnership with Conservation International (CI), sold Makira carbon offsets to rock band Pearl Jam for their 'carbon neutral' tour, social scientists carrying out research in the area were required by WCS to not mention 'carbon' or 'REDD' to communities lest they raised villagers' expectations. As scientists entered the forest to measure the amount of carbon stored in trees, forest communities were kept in the dark to what was going on. Word eventually got out and as 'carbon' and 'REDD' made it into these rural contexts, local Betsimisaraka began to refer to it as 'foreigners selling air/wind', *mivarotra rivotra ny vazaha*. Recently, a study (Brimont et al. 2015) assessing the impact of the project among these communities suggests that *tavy* farmers are the ones that have been affected the most, due to the restrictions on land use and expansion that have been imposed to 'avoid deforestation'. Additionally, the majority of these farmers have been left out of the project's development programme, since this has been mainly targeted at owners of permanent rice fields due to practical reasons. For *tavy* farmers, then, the sale of 'air' by the Makira Forest REDD+ has only translated into a decrease in the availability of farming land, with important consequences for present and future livelihoods.

In the last two chapters I explored one specific form, or social life, of 'carbon'—the carbon credit—and its articulation with ideas of value and waste in the forests of Andasibe. Carbon, from this perspective, appeared as

a well-defined—even if hard-to-achieve—object, made up of very specific elements (additionality, baseline, etc.) embodied in the presence of reforested trees and animated by their imagined absence in the future as a result of *tavy*. From its credit form, I now move on to explore some of the more concrete and socially entangled lives of carbon in the landscapes of Andasibe and Mahatsara. It is at this stage that carbon begins to lose some stability.

The story of the Makira Forest REDD+ Project offers apt examples of the shapes that carbon takes in the next two chapters. As we will see, when carbon enters rural contexts and is experienced by farmers, it loses some of its coherence as a single object with 'clearly identified boundaries' (Lien and Law 2011:67), sometimes even disappearing from view. Thus, we saw that as natural resource produced in the Makira forest for international markets, carbon could be made visible to scientists while remaining invisible to local people. Once it entered local landscapes and imaginaries, in turn, it was as elusive and dispersed as the 'air'—hard to know about and locate. As the experience of *tavy* farmers in Makira shows us, finally, carbon may even fail to materialise in any recognizable form, its presence only palpable through a new set of restrictions on land access imposed by outside actors that limit people's abilities to secure a livelihood.

In the next two chapters I will focus on the social lives of carbon in its unstable, elusive, or implicit forms in local lives and landscapes.

In chapter five I explore carbon in Mahatsara as an indistinguishable element of what I term the 'environmental state', experienced through spatial, and I will argue temporal, restrictions. As we will see, *tavy* is the pillar of social and material reproduction in Mahatsara, connecting people to their pasts, presents and futures. The impossibility to expand into new land due to conservation practice, and the consequences of being contained in space/time, have led to a constant feeling of being 'squeezed', *voatery*. This concept, I will argue, extends beyond its spatial and temporal connotations and articulates a broader commentary on local experiences of oppression

and power(lessness). Although carbon in this case is not explicitly talked about, it is implicit when farmers refer to the curtailment of movement, as carbon is inherently entangled with the practice of *tavy* in the interplay between agricultural expansion and the fixity of the carbon sink. I thus approach the social life of carbon in this chapter through the social and material relations of *tavy*.

In chapter six, on the other hand, I focus on the social life of carbon as natural resource through experiences of its extraction in Mahatsara, as I compare it to other sources of work and resources that have been present in these landscapes historically. As we will see, carbon labour in TAMS was characterised by feelings of volatility in its widest sense. As carbon failed to materialise in any expected form, in turn, the project became conceptualised as a 'scam', or *fitaka*. Intangibility, social distance and obscurity will be presented as key traits of carbon as natural resource, as I analyse the infrastructures, labour regimes and forms of exchange and value production that were set up in order to 'extract' carbon in Mahatsara. Although carbon in this case is explicitly talked about, it appears as an elusive and hard-to-locate object, where its very existence is doubted, leading to feelings of deceit.

# Chapter Five: *Voatery*, Oppression in Time and Space

## Introduction

> *'Life before was nice because people were free (libre ilay olona) but now people are squeezed (voatery) like now over the North there it belongs to Mitsinjo [conservation organization], here it belongs to the Park, and now also we have SAF with the tree seedlings that we offered [referring to TAMS], that is what makes people feel squeezed, squeezed!'*

Consider Dadan'i Lala's comments regarding problems of land access in Mahatsara. Although of local origin, Dadan'i Lala had lived for 35 years in the area of Sakalava, on the western side of the ridge that separates the Betsimisaraka area of Mahatsara/Andasibe from the Bezanozano one in Moramanga, where he worked as a driver. He moved to Mahatsara with his wife and younger kids around 2005 at the request of his father, a past graphite worker who was too old to work the land. As he settled in Mahatsara, Dadan'i Lala bought a small parcel of land from a friend, but he later gave half of it to TAMS. As we talked in 2011, Dadan'i Lala described life in Mahatsara as an experience of being squeezed into the centre of a triangle, in which each apex represented a different conservation initiative: Mitsinjo, the Park and TAMS. What all of these had in common in Dadan'i Lala's words was not their professed love for nature, nor the opportunities they brought to villagers, but their effect in limiting people's movements and

squeezing them into an increasingly smaller area: 'and here in the centre it belongs to the community (*fokonolona*), it is a small thing though, small!'

During my early days of fieldwork, as we returned from a morning in the fields, Raivo—my very first mentor in Mahatsara—and I began talking about the differences between my home and the village, and the daily hardships people faced here. She told me how between the months from October to February, when the old harvest has run out and the new one is not yet available, there would always be a *krizy* (from the French *crise* meaning crisis) in the village, when people wouldn't have enough to eat and a family of six might have to do with a *kapoaka* of rice per meal (a standard Malagasy measurement corresponding to an empty can of condensed milk; it is common for an adult in Mahatsara to have over half a *kapoaka* of rice at each meal). Others, she said, might just have *mangahazo*, or cassava, for lunch, denoting the level of hardship to which people were subjected, who were not even able to cook the staple food. When I asked her if this also happened in the past, she said that back then people had had enough to eat because they practised *tavy*, but then 'the state had progressively squeezed them', *voateritery ny fanjakana*, restricting the availability of land and thus reducing the amount of rice harvested yearly, because *tavy* was not allowed, *tsy azo atao*. *Krizy* in Mahatsara thus referred to a particular temporality effected by the state on a yearly basis, when families did not have the bare minimum to lead a 'normal' life. This dysfunctional temporality was both recurring and accelerating because, as we will see, current *tavy* regulations endanger Mahatsara's inhabitants' future in dramatic ways.

At the time of my conversation with Raivo, I took the idea of *voatery* at face value, as a reduction in the availability of land due to the prohibition to expand into further land. After hearing it countless times, however, I came to see it as a defining feature of contemporary experiences of life in Mahatsara, its meaning extending beyond its spatial connotations. As we will see, this form of constraint is also temporal, since the future (and to a certain extent the past, too) is being denied to people in Mahatsara. *Voatery*, in turn, does

not just mean 'narrow' or 'squeezed', but also 'pressed, distressed', and as I will argue below, 'oppressed'. In this sense, its meaning not only evokes ideas of containment in time and space, but it also articulates the broader experience of power(lessness) in the village, ultimately felt to negate people's capacity to attain full personhood.

In this chapter, then, I will explore the command over time and space effected by the state, *fanjakana*, in Mahatsara and its effects on local lives. It is essential to note that the state here does not just refer to the government, but rather to the cluster of administrative and governing bodies that regulate access to land through conservation practice, and which I term the 'environmental state'[77]. As we have seen above, TAMS is but one more instance of this oppressive force. Although carbon in this chapter does not appear explicitly, it must be seen as inherently entangled with the practice of *tavy* in the interplay between agricultural expansion and the fixity proposed by the carbon sink.

As a forest carbon project, in fact, TAMS is premised on a conservation/development discourse which represents Betsimisaraka farmers as lacking a future orientation and caught in a cycle of poverty as a result of *tavy*, and thus in need of intervention. Carbon, from this perspective, appears as an alternative to *tavy* and as a way of breaking out of this 'poverty cycle'. As we will see, however, not only are Betsimisaraka ideals of life deeply future-oriented, but it is the spatio-temporal constraint exerted by conservation practice, in fact, that locks them in an uncertain present and is leading to a loss of future—and even past—socio-material connections. Carbon, as part of these landscapes, appears to curtail those very futures it claims to enable.

This chapter is structured as follows: I begin by introducing the ways in which ideas about time and space take form in the Betsimisaraka imaginary. Contrary to current conservationist 'received wisdoms' that

[77] For a similar example see West's ethnography of conservation in Papua New Guinea where conservation is conceptualised as a 'second government' (West 2006:115).

portray Malagasy people as lacking a future orientation (as I show below), I will argue, following Keller (2015; 2008), that people in Mahatsara do think about, and engage with, their future(s). Expansion in time and space, or what Keller calls 'pro-gress' (2008:652), appears in fact as a life ideal for Malagasy populations, and gains an even greater weight, I suggest, in the case of *tavy* farmers. Focusing on foundational narratives told by the *Tangalamena* and a harvest ritual called *vonivao* or 'new seed', we will see how the ideal of expansion in time and space is understood in Mahatsara, and the way it relates to *tavy* as a key component in the (re)production of social and material life.

From this 'ideal', I turn to the present situation of land availability and *tavy* regulations in Mahatsara, which is everything but. With expansion in space and time curtailed, we will see how the 'environmental state' in Mahatsara is experienced as a powerful and oppressive force that threatens both present and future generations. *Voatery*, from this perspective, will be seen to articulate a broader discourse on local experiences of power(lessness).

Finally, I turn to the dominant conservationist/development discourse in Madagascar that portrays Betsimisaraka farmers as caught in a cycle of poverty and lacking a future orientation due to the practice of *tavy.* This discourse, which animates conservation/development practice, I will argue, effectively 'locks' the people of Mahatsara in space and time by confining them to an uncertain present and severing them from future and past connections, thus endangering the very same landscapes it claims to protect.

**Island of past, present and future connections**

Like 'hierarchy' for India, or 'urbanization' for Southern Africa (Appadurai 1988; Ferguson 1999:24), the theme of the past has become a dominant characterisation of anthropology in Madagascar, widely known as the 'Island of the Ancestors' in reference to the strong relationship that

binds Malagasy people to ancestral custom. As Cole and Middleton (2001) have argued, although ethnographic attention to ancestors in African ritual and religion almost disappeared after the 1970s, it has remained the main topic of enquiry in Madagascar. The past, from this perspective, figures predominantly in people's lives, as they constantly have recourse to it in the context of making a living in the present. Since Bloch's seminal studies on Merina religion and rituals (1971; 1986) we have learnt that a keystone of life in Madagascar is the task of reconciling an ideal past centred around ancestral custom and localities, with the needs and desires of the present. Countless aspects of Malagasy cosmology and social life have thus been examined in reference to the weaving of the past with the present, of the dead with the living (for example, Cole 2001; Feeley-Harnik 1991; Middleton 1999).

Nowhere are these connections more evident than in the relationship that binds people to land through the concept of the *tanindrazana*, literally the land of the ancestors. As a defining feature constitutive of the social group and of 'political, ritual and moral order(s)' (Cole 1997:447), the *tanindrazana* establishes, through the idiom of kinship, the ties that bind together the living, and the living and the dead. In the countryside, this is mainly done through the medium of agriculture, both past and present. Land and labour are therefore pillars of Malagasy social reproduction, both as main vehicles of sustenance and because it is here that relationships with ancestors are actualised: as people work, inhabit and care for the land where their ancestors are buried and dwell, they cultivate their individual and collective identity. As Feeley-Harnik argues, 'living, land and ancestry are inseparable' (1991:22) because either one lives in the land of their ancestors and is a 'master of the land' (*tompontany*), or lives elsewhere as 'stranger' (*vahiny*).

This tendency to focus on past connections through ancestral idioms, while relevant and fascinating in itself, has, however, led to a very specific vacuum in relation to the analysis of the future in Madagascar, a trend that

has only recently begun to change (Sodikoff 2013; Cole 2010; Keller 2008). From her previous work on memory (2001), for example, Cole has shifted her attention to the diverse understandings and expectations of the future held by the emergent category of youth, or '*jeunes*', in Toamasina during economic liberalisation in the island (2010). Her study follows young girls who turn to the sex economy with Europeans to escape economic hardship, or alternatively, those who turn to the Pentecostal Church with the same objectives. Although generational change tends to be presented locally as a total rupture with the past and ancestral customs, 'their day-to-day experience unsettles such divisions' (Cole 2010:98), showing that past, present and future ways of being and doing are complexly entangled. Ancestral practices, Cole argues, are not just a way of bringing the past into the present (as Bloch's famous Malinowski lecture (1977) postulated), but also 'figure the ideal relation between past and future' (2010:51). Indeed, as Walsh has argued, much of Malagasy ritual, while reaching out to the past, is ultimately done for 'the sake of the future' (2012:5). In the next section I explore past, present but also future understandings that link people's lives to the land they work and live in.

I specifically follow Eva Keller in her understanding of the rural Malagasy 'life ethos' as 'future oriented' since it is based on the ideal of 'forward movement' through the parallel processes of expanding into new land and extending one's kin through present and future generations (2008:652). Relationships with ancestors, she argues, are also future oriented because it is through ancestral blessing that the ideal of life as a 'process of growth' can ultimately be attained. This, in turn, involves the expansion of ancestral land, as the dead are buried in new localities after long and fruitful 'roots' have been established through generational reproduction, in a dual process of movement and rootedness. In this sense then,

> '"Growth" refers to a whole network of aspects, especially to generating many descendants and being able to give

> them land; to cultivating rice; and to obtaining one's ancestors' blessing, to which the growth of one's kin group testifies' (Keller 2008:652).

Keller gracefully employs the term 'pro-gress' in its literal form—'to walk forward' (2008:652)—in order to capture this ideal of generational growth and forward movement that extends into the future thanks to ancestral blessing. Past, present and future generations, therefore, are all implicated in the Malagasy journey of life.

While Keller suggests that this ideal of social reproduction may be 'close to pan-Malagasy' (2008:652), I would argue, building on Bloch's work (1971; 1975; 1986; 1995), that notions of movement and expansion *in space* gain particular salience among Betsimisaraka farmers, due to the social relations of production in *tavy*. This can be most clearly seen through Bloch's article (1975) on the different conceptualisations of property between the Merina—irrigated rice farmers—and the Zafimaniry—a group of *tavy* farmers. For the former, irrigated land agriculture in lowland valleys entails a particular scarcity of land which translates into concepts of property that aim to limit the 'dispersal' of land to outsiders, cogently contained in the Merina concept of 'inheritance not going away' (1975:209) or *lova tsy mifindra*. Their kinship system, or what Bloch has called the 'deme', is thus based on endogamy aimed at keeping ancestral property within the kin group, establishing a division between the affines, or *havana*, and outsiders, *vahiny,* that (in theory) can never be breached.

On the other hand, Bloch tells us that land for the Zafimaniry is not considered property a priori, but rather becomes so through labour. Instead of scarcity of land, we find a scarcity of workforce as its defining feature (cf. Goody 1971). As *tavy* requires constant expansion and the provision of collective labour, kinship and property ideas are therefore much more mobile and expansive, and lend themselves to the incorporation of outsiders, since these appear always as potential affines. Whereas irrigated

rice agriculture practised in scarce land is therefore related to a closed and rigid system of inheritance and descent, *tavy* allows for a much more dynamic and open system—where flux is positively valued. Notions of movement and expansion are therefore potentially productive for the Zafimaniry, whereas they are seen as a risk for 'dispersal' (Bloch 1975:188) for Merina farmers .

This analysis seems to apply to *tavy*-practising Betsimisaraka as well, explaining why marriage in Mahatsara is strikingly dynamic, as new and old couples move in together or separate without any clear apparent rules[78] (something also mentioned by Bloch (1975) in his article) or even ceremony. Similarly, the notions of *tompontany*, master of the land, and *vahiny* or stranger, were very rarely expressed in Mahatsara: only when a very specific conflict arose over a certain piece of land was property in this sense brought out. Finally, as we will see below, genealogical concepts in Mahatsara are evocative of movement across space/time, just like those Bloch describes for the Zafimaniry, where genealogies are made up of the names of localities, rather than specific ancestors, that expand from 'parent' to 'offspring' villages (Bloch 1995).

Bloch has argued, in turn, that these two different production and kinship systems put a very different focus upon the individual household: where the Zafimaniry see the house as repository of the hearth and reproduction, the Merina see it as 'antisocial' (Bloch 1975:210–211) due to the potential it poses for exclusion from land and dispersal into the hands of outsiders (through exogamous marriage). Instead of the house, then, descent unity and 'corporateness' (Bloch 1986:38) find expression for the Merina through the ideal of the tomb as the site where the group is actually made and, importantly, contained. The Merina, Bloch argues, look toward the future in a particularly strange way: with the tomb as its symbol of

78 In general, kinship in Mahatsara can be seen as a 'bilateral system with a patrilineal bias' (2010:52), as Cole has described it for east-coast Betsimisaraka, but with a strong sense of dynamism.

continuity (Bloch 1975:208) and where 'the image created by descent is a fundamental negation of the experience of life', being based on 'stillness in space and time'[79] (1986:168). Although taking a different perspective, Graeber's analysis of secondary burial ritual among the Merina also brings attention to the essence of ancestral authority as that of constraint through restriction—what he terms 'negative authority' (2007:62). Although this type of authority may be seen as generally characteristic of ancestors across Madagascar, its spatial connotations appear particularly significant for the Merina, where 'pulling people together' mainly entails 'acquiring enough land and property to prevent one's children and grandchildren from drifting away' (Graeber 2007:62), therefore containing people in space.

It may thus be tentatively argued that while Betsimisaraka philosophy/cosmology (and, equally, that of the Zafimaniry or other *tavy* farmers) is one of 'life' (Mangalaza 1998) and movement, that of the Merina is a philosophy of 'death' and spatial containment. This is best exemplified in the way tombs are treated among each group: hidden in the forest and only visited on specific occasions for the former (Bloch 1995; Cole and Middleton 2001), or perched on top of the hills that dominate the highland plateau, occupying the most prominent spots in the Merina landscape and acting as 'fixed centers' (Graeber 2007:54).

These differences, of course, must be seen as subtle variations on common themes. While Betsimisaraka ancestral/elder authority is also partly constructed on the basis of keeping offspring close to oneself, so do Merina aim to attain good futures through ancestral blessing. Similarly, expansion of land through *tavy* is not a type of nomadism in the strict sense of the word, and irrigated rice agriculture does entail expansion into new areas. There is a series of elements, however, that, it could be argued, relates

79 Bloch explores this theme further in his works on Merina funerary and circumcision rituals (1971; 1986) by looking at the denial of time and the creation of a timeless, unchanging society located in the ancestral domain. This timeless order, Bloch further argues, is a way of establishing an undeniable authority. I do not follow these ideas here, but rather concentrate on the opposition between descent groups and kinship which he takes on both of these works.

to the social relations of each form of agriculture, which makes spatial movement be more or less significant in ideas of growth[80]. Therefore, whereas growth through generational time may be seen as pan-Malagasy, growth through movement in space could be said to gain a bigger weight among Betsimisaraka and other *tavy* farmers.

In order to turn these general ideas into more specific ways of understanding them in Mahatsara, I focus below on local forms of articulating social and material reproduction with expansion in time and space. I specifically explore two elements: on the one hand, I look at foundational narratives told by the *Tangalamena*, which, as we will see, bring together the landscape and the past through the medium of labour; on the other hand, I analyse a yearly harvest ritual, the *vonivao*, where the essence of social and material reproduction—that is, 'growth'—is enacted and where the past is mobilized in the present to guarantee a particular vision of the future. In both cases, rivers appear as prominent elements constitutive of social life over time, and it is thus, I will argue, that notions of expansion in time and space must be seen in Mahatsara: as an intricate network of kin-based relationships where each feeds from its predecessor in a continuous, expansive flow.

This first part of the chapter draws strongly on the *Tangalamena*'s narratives and explanations as spiritual/religious leader and as conveyor of ancestral history. Although I tried to access this type of knowledge from other sources, I was always referred back to the *Tangalamena*, because he was the one who 'really knew'. I therefore present these ancestral connections as they would be in Mahatsara—through the *Tangalamena*'s words—but I do acknowledge that landscapes can be 'polysemic' (Bender and Winer 2001:10) and seen differently by different people. The second

80 It is interesting to note, for example, Bloch's (1995) speculation that as Zafimaniry have turned to irrigated rice agriculture, (due to land unavailability and population growth), these rice valleys may have become stronger symbols of human permanence and attachment to land than villages, something that did not happen with their *tavy* fields .

part of the chapter, therefore, reflects more general comments and feelings made by other villagers, and which were not, in fact, expressed by the *Tangalamena*.

*(Re)Productive Landscapes*

In his article on the temporality of the landscape, Ingold (1993) employs an analogy between orchestral performance and social life to bring attention to the act of 'resonance' (1993:160) as constitutive of both music and sociality. If a successful musical performance depends on each musician's attention to the rest of the orchestral elements in order to achieve such resonance, so does social life emerge from 'people's mutually attentive engagement in shared contexts of practical activity' (1993:160). The ensemble of this practical activity—what Ingold terms the 'taskscape' (1993:158)—has an intrinsic temporality because it reaches both to the past and to the future as people 'carry forward the process of social life' (1993:157) in their daily acts of living, working and inhabiting the land. Through another beautiful analogy, Ingold describes the present as gathering 'the past and future into itself, like refractions in a crystal ball' (1993:159). As a set of related tasks in constant flux carried out in the context of 'dwelling' (see Ingold 2000), the 'taskscape' may be seen as the equivalent of music in the example of the orchestra. The landscape, from this perspective, appears as the 'congealed' or 'embodied' (1993:162) form of the endless melody that people make up as they attend to one another in the context of living[81] and therefore offers a glimpse into the ways expansion in time and space is entangled with social reproduction and labour. What kinds of elements or beings compose, and resonate in, the landscape of Mahatsara,

81 From Ingold's perspective, the landscape, however, must not be seen as the result of a process of 'inscription' where cultural design is imposed on an outside natural world, but rather as one of 'incorporation' through the act of dwelling, where 'the landscape becomes part of us, just as we become part of it' (1993:63). The rejection of the division between 'inner and outer world', or a nature/culture ontology lies at the basis of Ingold's work and his concept of 'dwelling' (2000).

as embodiment of social life over time? And how is harmony imagined or experienced?

**Figure 10. Landscape seen from the tavy fields ready to be harvested (front), with patches of savoka or fallows in the background and some remaining primary forest on top. Photograph taken by author in February 2013.**

A look at foundational narratives in Mahatsara already points to those elements that are seen as meaningful or significant as constitutive of social life. These are the 'stories/history of the elders (big/powerful people)', *tantaran'ny olona maventy,* told by the *Tangalamena* as conveyor of ancestral history in his role of spiritual leader. In his narrative, the working of the local landscape appears as the medium through which history is made and, at the same time, anchored in the land. Thus, he claims, local settlement dates back to 1828, as Betsimisaraka arrived from the east 'in search of a livelihood', *fitadiavana or mandremby*. The first founding father to arrive in the area was *Ingahy Be Lefitana* ('the great Lefitana') who 'created/produced', *namorona*, the field that flanks the river that is today known as 'Sahatana'—a contraction meaning 'the field of Lefitana' (and previously known *as madio fasika*, or 'clean sand'). Similarly, the river that

crosses Andasibe, Sahatandra, (literally Tandra's field) refers to the field of Lefitana's sister, Viavy Tandra, and Analamazaotra, the story goes, draws its name from Lefitana's brother-in-law, Ranaotra. Other migrants later followed these original founders from both north and south eastern Betsimisaraka factions, and through further generations, *taranaka,* the area 'became ancestral land', *lasa tanindrazana*. We can see how local history is articulated through toponyms which give sense to the landscape on the basis of kinship and an expansive form of labour: founding fathers (and mothers) arrived in the area in search of a livelihood and settled by a river, and the area appears as a collection of river/fields belonging to family members who established roots by working the land and having children. It is important to note that settlement alone does not constitute the ancestral landscape, but it is rather the working of the land by the river—the 'creation of a field'—that turns previously unclaimed land into ancestral property—and thus into history. It is interesting that until they become the field of such and such, rivers were known by their physical properties alone, such as 'clean sand' for Sahatana, or 'many worms', '*beolotra*', for Analamazaotra. The landscape, therefore, appears as a map through which to read Betsimisaraka history through the idiom of an expansive movement in which labour and property are mutually imbricated, since every arrival involves socialising previously unclaimed land through the means of agriculture. This already shows a significant departure from the concept of 'property that does not change hands' among the Merina, as it is expansion in search of a livelihood—*fitadiavana/mandremby*—and the working of new found land that establishes origins and claims of historical and ancestral legitimacy to places.

This example is similar to that of Manggarai landscapes in eastern Indonesia explored by Allerton, where the history of the Wae Rebo people 'is essentially the history of an ancestral journey from place to place' which establishes 'connections between topographical features and ancestral actions' (2012:181–182). We can see how these 'actions' in Mahatsara's

foundational narratives mainly entail agriculture. Succession in time is in turn conflated with expansion in space in a variant form of what Fox has called 'topogeny' (2006:8) to qualify the Austronesian practice of reciting 'ordered succession of place names' as a kind of topographical genealogy.

In any case, we can see that in local understandings of history, places and people seem to come together though the medium of labour and social reproduction, where the ancestor, the river and the field become practically one and the same. This will be more clearly seen below through the image of the *loharano*, or water spring, and the way it is called upon in the 'new seed' ritual. In his study on the Temanambondro of south-east Madagascar, Thomas has noted how the use of water in specific rituals plays a pivotal role in making them 'place-specific' (2006:25). It is not simply the sacred efficacy (*hasina*) of water that makes it generative in ritual, then, but rather its association to a particular place, making it a key element of what Thomas calls 'local cartographies of the sacred' (2006:25). The *loharano* as employed in the ritual, we will see, unfolds a very particular 'cartography' of the landscape of Mahatsara, one that is expansive and cumulative.

*The Vonivao, or 'new seed' ritual*

The *vonivao* is a calendric harvest ritual that must be performed yearly towards the end of the harvest period, between April and May, when new, unripe rice, called *lango*, is still available (reasons explored below)[82]. It does not depend on a fixed date, but rather on the conditions of the harvest and the family carrying it out, such as the availability of cash and crops. Also known as the 'rice feast', *fetin'ny vary*, its main element is the offering made to God and the ancestors of their 'share', *anjara*, of the harvest, and the request for their blessing in next year's harvest or in any other future

82 The vonivao is the equivalent of the better-known santa-bary ritual that takes places in various regions across the island. I have not been able to find any references to the vonivao in the literature, and I assume it is a local/regional element. I have not compared it to the santa-bary because I am trying to specifically get at local ways of knowing and experiencing the landscape in Mahatsara.

endeavours that will be taken on. The offering can also be employed as thanks for past requests or vows, *voady*, that have already materialised. As will become evident through the chapter, this God—equally known as *Zanahary* or *Andriamanitra*—is a sort of all-powerful creator or force which lacks any 'moral purpose' (Bloch 1995:67), and is 'arbitrary and potentially violent' (Graeber 2007:21). I find Bloch's description of *Zanahary/Andriamanitra* for the Zafimaniry as 'the external, unchangeable parameters of one's life, including the topography, which affect people in ways beyond explanation' (1995:67), as particularly apt for the way this power is imagined in Mahatsara.

I attended one of the last *vonivao*s of the season in the area, hosted by a woman called Soahary and her husband Julien. Both of them are particularly keen on ancestral custom, being also hosts to another yearly ritual—a cleansing, spirit possession event in a sacred waterfall inside the Park—which only they celebrate (this may stem from the fact that Soahary has a healing gift, making her more prone to ancestral considerations). Although *vonivao*s used to be much bigger, more collective gatherings in the past, they are today practiced only within the family and do not involve neighbours due to a lack of resources. This specific ritual took place at the family's beautiful compound in Andranomahintsy, about half a kilometre away from the village of Mahatsara, where four family houses are surrounded by banana, peach and coffee trees, and edged by the river where they hold some irrigated rice fields. As is usually the case for these events, the *Tangalamena* had been called in by the family to perform the role of director, as spiritual mediator between the living and the dead. Four generations were present, from Soahary's mother to her new-born granddaughter, totalling seven adults and about five children, plus the *Tangalamena*, my assistant and me.

For the offering and performance of the ritual, a *fandambanana*—a small square piece of woven fibre used as eating mat—was set under the window, opposite the door of the house, in the north-east corner. This space

is what Bloch describes as the 'corner of the ancestors, which is the holiest part of the house analogous to the tomb' (1986:52), and a fundamental feature of Malagasy spatiality. Under the window, and next to the offering, two hats were placed—one for a bald ancestor who would have been embarrassed to join otherwise—and an axe for those ancestors who had worked as lumberjacks. It is essential to note that these are big ancestral personalities that pertain to the area, and are not necessarily directly related to the family carrying out the ritual, whose ancestors are later invoked.

Seven offerings were made, apart from rice, involving those products that are considered important in guaranteeing a satisfying life, and placed at the top of the mat (honey, coffee, homemade rum, beer, *betsabetsa*, a local alcoholic sweet drink which is always consumed in rituals, and chewing tobacco or *paraky*). At the centre, rice was placed on a big banana leaf, ordered into two main lumps and surrounded by six smaller handfuls of *lango*. As a harvest ritual, the *vonivao* is pregnant with the symbolism of fertility, and it is thus that rice is categorised into three distinct types: male rice, *vary lahy,* female rice, *vary vavy*, and *lango*, which could be seen as 'offspring' rice in that it is an immature form of rice. This categorisation is not one present in everyday life, but only attends to the method of preparing, consuming and offering it in this particular ritual. As the *Tangalamena* explained, male rice must be boiled in the pot with no lid on it, and eaten standing (in theory), quickly and without spoons, because 'men are always on the go'. Female rice, on the other hand, is cooked with the lid, and eaten with its accompaniment, beans and greens in this case, and with cutlery, in reference to women's domestic roles. *Lango*, finally, is not cooked at all, only pounded, probably referring to the idea of immaturity characteristic of children. Rice, or more specifically the rice from *tavy* fields[83], becomes therefore the medium through which to convey ideas

83 It is essential to note that the rice used for the ritual comes from the *tavy* fields, although this particular family had irrigated rice fields. When I asked the *Tangalamena* whether paddy rice could be used he said it could, but he was actually referring to the

about sexual duality and fertility in relation to a successful future of both harvests and generations.

The idea of sexual duality was not just present in the offering but was continuously deployed in the *Tangalamena*'s *kabary*, the ritual speech that makes up the main body of the event: he addressed God in its sexualised forms—male and female, *Zanahary lahy, Zanahary vavy*—and called forth the family's ancestors, appealing first to those of the participating women, 'from your mother and from your father', and then those of the men, 'from your mother and from your father'. As he mentioned women, in turn, he constantly referred to them as '*loharano nisehoana'*, or the 'sources of origins'. The *Tangalamena* thus invited God and the ancestors (in that order[84]) to join in and have their rightful piece of the harvest, in turn requesting their blessing for 'good health, good harvest and giving birth to 7 boys and 7 girls'[85]. As he talked to God, the *Tangalamena* explained that the family performing the ritual 'worked the rice', *niasa vary*, just as God had instructed the sons of human beings should do, and exemplified through various rhetoric devices the importance of rice for one's livelihood, qualifying it as 'the root of life', *ny vary aró no fototry ny aina*. He enumerated the problems found in the harvest (such as rats, cyclones or the fact that the land belonged to the government) and pondered whether these things came about due to some mistake people had made—'the young ones do not know about taboos'—or it was simply God's wish. The *Tangalamena* called forth a bad or evil ancestor[86]—one whose passing through the village, I was told, meant that fights would break out or harvests would be ruined—putting small amounts of each offering in a piece of banana leaf and

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similar ritual carried out by the Bezanozano, who are irrigated rice farmers. The vonivao, in other words, is a *tavy* related ritual, since it is the agricultural practice of the ancestors.

84 Although both are powerful beings, there is an established hierarchy where God is placed above the ancestors, who, after all, are human beings with all their human faults, as the *Tangalamena* explained.

85 This is a formulaic phrase in Madagascar representative of a successful life.

86 This evil ancestor was later explained to me as being a 'jiny', a bad spirit that inhabits landscape features such as trees or rocks. Sodikoff has explained jiñy or tsiñy as 'ancestors gone wild' (2012a:148).

instructing for it to be put out at the gate outside the house, so he would not bother the living. A couple of other small packages of offerings were further made to take to the *tavy* fields, for those ancestors who had not been able to attend.

The *Tangalamena* finally called forth all the *loharano*, or 'water springs' in the area, naming key rivers from the south and west first, and then those from north and east. He did this through a formulaic form in which he called forth all those that flank or border, *mihoroka*, each river, 'from its curves to its stretches', *hatram-binaniny arí, jusqu'á ampanihintsininy iny*, in a sort of oral mapping exercise for an area that extended beyond Andasibe (i.e. Lakato, Mangoro, etc). It is essential to note that although *loharano* refers to water springs or sources, it also means here both the whole course of rivers and each and every ancestor that has ever inhabited them. The *loharano* were in fact later explained by the *Tangalamena* as types or ancestries of people, *karazan'olona*, that inhabit each cardinal point. Interestingly, these go beyond Betsimisaraka themselves and contain the generations of other ethnic groups such as Bezanozano, Sihanaka or Tsimihety. The established form 'bordering such river, from its curves to its straights', is in fact a 'call to every ancestor', *fitsoka razana iray manontolo*, which makes sure that not one of them is forgotten and not called forth. In the *Tangalamena*'s words, it is a way of 'respecting' every single one of them, big and small. I will return to the significance of the *loharano* below. The ritual ended with everyone throwing themselves at the offering, consuming everything in an instant (to get some of God's and the ancestors' saliva, I was told), with the leftovers on the floor swept and left under the window. After the official speech was over, male rice, female rice and *lango* were consumed in that order among the living, and before saying goodbye the drinks were served for everyone to enjoy.

We have seen how the idea of sexual duality is continuously brought out in the ritual, as a symbol of fertility in its widest sense. This does not just refer to fertility among the living but to a broader form of sexual duality—

equally applying to rice, ancestors and God—as reproductive of the social and material basis of life, where (*tavy*) harvests and generations appear as mutually implicated. The ideal of reproduction that is enacted in the ritual is however not limited to that of individual households and their lineages, nor even that of the village, for that matter: it rather encompasses every ancestry that is felt to be part of the local landscape, a space that is very broadly understood/experienced. In a sense, it establishes an extremely elastic 'overarching' or 'surpassing' community (*communité de dépassement*) in the sense described by Althabe (1969) for the Betsimisaraka of the east coast, where sexualised forest divinities work to overcome individual lineages by creating a community of equals or 'co-existants'[87] who inhabit a common landscape (Althabe 1969:114). This fits well with Bloch's description of Zafimaniry ways of continually incorporating 'strangers' into 'affines' (1975). Equals, then, in this case, refers to every person—dead or alive—that has ever dwelled in the landscape, as each and every one of them contributes to the expansion of social life over time.

This is best exemplified in the figure of the *loharano*, an element that conflates ancestries and rivers as sources of life. These sources, however, do not refer to a founding ancestor or a particular water-spring: it is rather their flux, through generations and rivers' whole courses, 'from its stretches to its curves' (every single ancestor at every point of the river), that constitute the social landscape as (re)productive. Life, as is understood in Mahatsara, while stemming from a particular point, is nothing without flux and expansion through space and time. The significance of rivers, in turn, as we saw with the case of foundational narratives, is constructed through its relation to land and its working, as rivers and agricultural fields are imagined as composing a whole (remember, through settlement and work, the river becomes the field of such and such). The flux of life, therefore,

87 As Graeber has argued, a recurring theme in ethnographies of Madagascar, Althabe's among them, is this idea that 'a community of equals can only be created by common subordination to some overarching force' (2007:21).

necessarily entails the working of the land through *tavy*, as the main element through which social life in the present is 'carried forward' (Ingold 1993:157) from the past towards the future. As the flow of the river, *tavy* propels the expansion in space and time of past, present and future generations.

We have therefore seen how Malagasy ideals of 'growth' as forward movement (Keller 2008) take shape in the landscape of Mahatsara. This is, however, just an ideal, and the actual landscape of Mahatsara and the experiences thereof are indeed very far from it. Let us see how.

### ***Voatery*: Containment in time and space**

Located right by the primary forest, Mahatsara enjoys some of the most breath-taking views I have ever experienced. In 2013, the back of the *Tangalamena*'s house, which lies at the highest point of the village, was cleared for building a village common-house, *tranompokonolona*. The project never materialised for various reasons, but the clearing allowed one to look over the village fields, and across the road to the National Park: an immense extension of thick, lush, dark green forest, fog emanating from treetops, soaring birds, and the hunting howls of lemurs as its soundtrack.

**Figure 11. The Andasibe-Mantadia National Park seen from the back of the *Tangalamena*'s house. Photograph taken by author in March 2013.**

In the thrill of the moment, I easily forgot that this impressive landscape was, for the most part, off-bounds to villagers, who would risk fines and imprisonment if they were ever caught inside.

In his article on Zafimaniry perceptions of the landscape, Bloch notes how views of cleared trees are associated and enjoyed as views of clarity and spaciousness, in contrast to the 'oppressively and menacingly enveloping' (1995:66) forest, which would seem to conjure darkness. This clarity is not just aesthetic but also relates to central aspects of Zafimaniry values which hinge on social reproduction and its rooting to the landscape as a way of transcending human impermanence and weakness in the face of an uncaring and hostile environment. The darkness of the forest in Mahatsara could be said to be double: not only is it dark in comparison to the clarity of the fields and village (the signs of the (temporary) success of

people over the environment), it is also dark because it represents contemporary feelings of oppression and decline.

In a sense, this is like the case of 'modernization through the looking glass' that Ferguson (Ferguson 1999:13) describes for the case of the Zambian Copperbelt, where modernity is relegated to nostalgia, and decline is anticipated in the face of excruciating hardship. The views that I so much enjoyed were, for the people in Mahatsara, not evocative of the potential to overcome darkness and establish a much-desired clarity, as in the Zafimaniry case above, but exactly the opposite. Learning to see the forest through everything that it may *not* become, meant seeing that darkness as ever encroaching on Mahatsara and its peoples, a feeling that was unequivocally articulated as one of being squeezed/narrowed down in space: *tery*, or narrow, and *voatery, or* being squeezed/made narrow by someone.

Mahatsara is indeed a very particular place, bearing the marks of having been created by an outside entity, and thus far from the organic form of expansion I have described above. It has to be remembered that it was created in 2001 by the Park authorities as a 'pilot village', grouping those people that had until then lived inside the Park. The idea of one single location in which various lineages of extended families cohabit in a relatively reduced space is actually a foreign concept for villagers, one characteristic of larger towns, such as Andasibe. As Graeber has argued for the highlands, the idea of town or village, *tanana*, refers to 'any place of human habitation' (2007:13), its size being highly variable. In Mahatsara, *tanana* is ideally seen as a small family hamlet centred around a head couple and composed of a few houses surrounded by ample terrain, often filled with fruit trees, close to drinking water and often not too far from the main road. When asked what life used to be like before they were moved to Mahatsara—and people always make it explicit that they were moved 'by them', *nafindran-jareo* ('them' explored below)—villagers are quick to remark this fact, and the feeling of confinement they find in the current village. This is usually

accompanied by complaints regarding the lack of promised 'development'—most notably a hospital and a school—and the lack of co-operation among villagers. Far from a 'pilot village', or even a village for that matter, Mahatsara looks more like the remnants of a failed experiment, an unvoiced, uncomfortable feeling of forced grouping always looming over it.

Feelings of confinement due to resettlement and space compression are further increased by the fact that protected areas have progressively surrounded Mahatsara since its creation in 2001, as the epitaph to this chapter reveals.

The idea of being narrowed down or squeezed in space comes out very strongly too when referring to *tavy* regulations, generally conceptualised in the village as the impossibility to 'expand' into further land—*tsy azo manitatra, tsy afaka mihitatra*. People therefore practice a settled form of *tavy*, working on the same space they were given when they were moved to Mahatsara over 10 years ago. Instead of acquiring new land[88] so that the land worked during previous years can be left fallow for enough time to regain its fertility[89], people claim they have to divide the land they work into parcels so that some of it can be left fallow for a couple of years at a time. As Maman'i Jo described the process:

> 'We can only do *tavy* in the area that we received because it was already delimited how many hectares corresponded to us and it is there that we move frequently. You can't expand into other land. It is this little piece of land that we share, here we do this, here we do that, in a given year'.

This means that land is increasingly infertile, with a consequent reduction in the amount of produce harvested. If, in the past, rice could last

88 Traditionally, it was the task of the Tangalamena to manage expansion into new land, but this is impossible under current regulations.

89 Ideally ten to fifteen years although this varies according to regulation and population growth.

for almost a year, in the present it lasts for no more than six months. During the rest of the year, then, people are forced to buy rice and therefore search for sources of income, which, being highly scarce, translate into the yearly '*krizy*' between October and February, as explained in the introduction. Although some of the most powerful families in Mahatsara do have access to land appropriate to irrigated agriculture, most of them don't. For most of the inhabitants of Mahatsara, then, land is both unproductive and insufficient. This constitutes a very worrying situation because with expansion of land limited, an already infertile patch has to be increasingly subdivided as children come off age. Maman'i Tefy mother of two, 8 and 15, described it in the following terms:

> 'it is that piece of land that we have to share with the children, because you can't go there or there [meaning expanding into new areas], and it gets smaller and smaller (*mihakely dia mihakely*), and it is that bit that we have to share. It is not enough'.

The future, from this perspective, looks bleak and uncertain[90]. *Voatery* in Malagasy, however, does not just refer to the act of being narrowed in space by someone else, but the same idea of being squeezed can also signify notions of oppression, as in being constrained or commanded by someone else. As we have seen, feelings of constraint come about partly in people's memories of past displacement and current *tavy* regulations, which force people into confined spaces. Additionally, they appear in everyday feelings of subjugation and fear, as even the most mundane aspects of life in Mahatsara are under constant surveillance.

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90 In a similar way, Hughes argues that the Great Limpopo Transboundary Conservation Area that spans across South Africa, Zimbabwe and Mozambique (and is claimed to be the largest conservation area in the world), 'constrains small-scale farmers' in both space and time, 'while freeing large-scale investors and tourists' (Hughes 2005:161). This is done by fixing people in space through planning, where peasants' mobility and expansion are negated, and their future becomes uncertain.

Since encroaching on further land can lead to imprisonment or fines, yet *tavy* is insufficient for a family to survive on, people have to look for other ways of making a living. One of the key economic activities during 2013 supplementing *tavy* was gold digging. This, and other activities I cannot mention here due to privacy reasons, however, are also proscribed by law, and people therefore live in a constant state of illegality and fear of repression, for even everyday tasks, such as collecting firewood or honey, can get one into trouble with the authorities if done inside protected areas. Jokes and remarks about this fact abound in people's everyday conversations, eliciting resentful comments such as 'you can't even poop inside the park', *na dia mangery ary tsy azo atao*. I once heard, for example, an elder admonishing her 5 year old grandchild for having captured a hedgehog (outside the Park): 'if Rainer [from Mitsinjo, the conservation organization] finds out, you will get in trouble!' she said. Notions of entitlement, property and legitimacy also enter these types of commentaries. Someone, for example, remarked that, as an element found in the river, surely 'gold had no owner!', and women puzzled over the absurdity of some regulations, such as the prohibition on taking *herana*, a fibre used to weave: 'it's not like cutting a tree which then dies', they said, '*herana* grows back again!'. After my (naive) suggestion that we could try to get permission from the Park for people to collect honey to make some cash, an awkward silence followed, and I was later tacitly asked not to mention it at all, *tsy asina resaka*, for 'they' were really difficult/oversensitive, *sarotiny*. In general, these ideas are more broadly articulated as a feeling of being scared, *matahotra*, of being caught or sent into prison, *gadra*, and even if they are usually brought out in a humouristic tone in conversation, they point to a very real experience of fear and subjugation in Mahatsara.

In this dire situation, a recurring narrative among those over 35 years of age is 'Ratsiraka's Five year plan' when one could obtain administrative permission to clear as much land as one wanted for a renewable period of five years, between 1975 and 1983. I already explored 'the Five year plan' in

the previous chapter, arguing that, contrary to general understandings which posit this post-independence era under Ratsiraka's rule as one of strict *tavy* controls and general hardship, this period is surprisingly cherished by people in Mahatsara. As I argued, the 'Five year plan' may be seen as part of Ratsiraka's project of integrating subsistence farmers into the national economy with the aim of securing rice self-sufficiency, a keystone of his socialist endeavour. In Mahatsara, it translated into an unrestricted practice of *tavy*, and this era is constantly remembered and brought up in conversation as a time of prosperity and, to an important extent freedom, in comparison to the present situation. As Faly, one of Mahatsara's local smiths remembered,

> 'Oh, during those days! During the 'Five year plan' life was pleasant (*mahafinaritra*) because you could go into any land you liked, you could do *tavy*, go into any land you liked [emphasizes expansion], and there were no conflicts/discords (*gidragidra*) … But you were allowed to do what pleased you/what filled your heart *(izay herim-pon-tena lela*), you were allowed to do whatever you wanted to make yourself living (*iveloman-tena*) during the five year plan. It was really good during that time, there was nothing to scare you, it was only your own strength that limited you [in terms of working the land]; it was not like now'.

Faly's comment portrays the 'Five year plan' as a time of both unrestricted expansion and autonomy, where one could do whatever one needed to 'make oneself living', *iveloman-tena*, without external impositions; as he argues, unlike today, the limits back then were marked by each person's strength alone. The idea of 'making oneself living' also appears in Keller's ethnography through the concept of *tany fivelomana*, which she translates as 'land that enables life' (2008:656). The future is powerfully

present in this notion, Keller argues, because it refers to both actual and potential land for future generations. Both 'land that enables life', and 'making oneself living' thus extend beyond the mere material and encompass those elements that we saw as defining a successful life of 'growth'. This gains even more force if we consider Cole's (2010) description of this notion of 'making oneself and others living', *mahamelona tena*, as a key defining feature of Malagasy life that refers to the achievement of 'valued forms of personhood' (2010:96). By using the capacity (*hasina*) bestowed by the ancestors to make oneself and one's own family 'living', Cole argues, this notion marks a 'full-fledged' adult, as a 'generative' subject both socially and materially (2010:52). The idea of 'making oneself living' as employed by Faly above, then, can also be seen as a commentary on restrictions on expansion as a form of denying the freedom or agency to dictate the 'how' of making oneself alive, and, even more centrally, the ability to achieve a full personhood/adulthood.

The situation in Mahatsara in fact bears striking similarities with Keller's (2008; 2015) analysis of villagers in the northeast who have seen access to land denied over the last two decades by the establishment of the Masoala National Park. One of Keller's field sites, the village of Marofototra, could actually be seen as Masoala's parallel to Mahatsara, as it is a new village created by the park authorities to gather the various hamlets that were previously scattered around the now protected forest. Like Mahatsara, Marofototra is surrounded by protected areas where livelihood activities are highly regulated and *tavy* is subject to strict limitations. Where people in Mahatsara articulate the situation in terms of being squeezed, *voatery*, those in Masoala do it in terms of having been 'defeated' in the purpose of life, *resy (*Keller 2008*:656)*. In turn, in both cases, oppression seems to come from shadowy or undefined forces, usually conceptualised simply as 'them' (*zare* in Keller's case, *zareo* in mine). In Mahatsara, when talking about resettlement and restrictions, people would indistinctively refer to 'them'. In both cases, finally, the present condition has led to the past being

reminiscent of a time 'when people were still free' ('*mbôla libre anteña'* (Keller 2008:658)/*mbola libre ny olona* in Mahatsara)[91].

Taken together, I suggest, these experiences and the way they are articulated are powerful commentaries on present feelings of oppression exerted by what could be conceptualised as an 'environmental state'. This state does not necessarily take the form of current or past governments alone, but it rather refers to the amalgam of outside restrictive forces that limit access to land and livelihoods at any one time[92]. In fact, as Althabe (1969) argued for the Betsimisaraka of the east-coast, *fanjakana*—usually translated as the state—must be seen as *any* 'outside oppressive force' (1969:37). TAMS, as a project that aimed to halt the practice of *tavy* and turn these fields into carbon sinks, must thus be seen as part of the 'environmental state'.

As we have seen, *voatery* calls to the notion of people being squeezed in space, and governed by outside forces that regulate not just daily activities, but, importantly, expansion into new land for the practice of *tavy*. This inability to expand agricultural land, as we have seen, does not just translate into hardship in the present, but also—and very significantly—into an impossibility to guarantee this *and* the next generations' future, since land is both insufficient and increasingly infertile and will not be enough for children as they come of age. Further, expansion in space, as we saw in the first section, is inherently entangled with expansion in time, as both pasts and presents are supposed to be taken over to the future through the medium of labour according to Betsimisaraka ideals. By confining people in

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91 'Freedom' and the capacity to achieve full personhood/adulthood are in turn deeply imbricated concepts in Madagascar due to the legacy of slavery. It is no surprise, in fact, that Keller mentions fears of going back to slavery as a result of conservation restrictions in her ethnography (2015; 2008), since the incapacity to 'make oneself living' denotes a sense of childhood that is also associated to slavery as 'a state of being perpetually junior' (Cole 2010:57; see also Graeber 2007; Evers 2002). I did not encounter any comments regarding slavery as such in Mahatsara, however.

92 A similar point is made by Keller (2005) when she argues that in Masoala the central Malagasy government and white foreigners merge into 'one hostile other' (195)—a 'shadowy consortium' of outsiders who come together as a result of conservation practice.

space through prohibitions on expansion, the 'environmental state' is effectively locking people in space but also in time, by denying Betsimisaraka (re)productive capacities that span from the past and into the future. *Voatery* must therefore be seen as a commentary on the command of the environmental state over space and time, limiting the capacity to attain full personhood, and as thus evocative of local experiences of power(lessness) in Mahatsara.

Discussing conceptions of oppression, Mangalaza (1998) has argued that the metaphor of the cyclone is central to Betsimisaraka thought on power. 'The wind, like power, can be the best and worst of things', he argues,

> 'as a zephyr [gentle breeze], it is a source of life, of happiness, and leaves seem to greet it as it caresses them. As a cyclone, it expresses sectarian authoritarianism, unfair, based on an oppressive force that does not take anything or anyone into account in its aggression' (Mangalaza 1998:15–16; personal translation).

Power, from this perspective, appears as highly arbitrary and capricious, with the capacity to inflict violence as much as benevolence, depending on which way the wind blows. Experiences of the 'environmental state' in Mahatsara seem to conform to this idea of an arbitrary power that can either be the source of happiness or that of extreme hardship. At times, this outside force was seen as the source of 'development', through its promises of infrastructure in the 'pilot village' or through TAMS' apparent potential to provide revenue and work, for example (explored in the next chapter). For others, as we have seen throughout this chapter, this power is experienced as oppressive, fearsome, and not far from fatal. It is not surprising, therefore, that Maman'i Njiva, one of Mahatsara's most powerful women, who has seen a few of her children thrive thanks to conservation work while the rest suffer due to its oppression, would depict the state as God's kin, as she stated that:

'The state is God's grandson: it can make you live or it can make you die'.

Through this sentence, the powerful, oppressive and arbitrary force of the 'environmental state' as experienced in Mahatsara appears akin to God. This view of power strongly resonates with Bloch's description of Zafimaniry understandings of God (1995:67) presented above, and it is in fact a similarity that seems to crop up in Malagasy ethnographies. Graeber (2007) too, for example, describes the 'Malagasy' view of God (in contrast to the Christian view held among the Merina) as morally ambivalent, where its potential for future destruction and arbitrary violence is acknowledged. This is not far, he argues, from the way the government was experienced in the village of Betafo, as 'essentially alien, predatory, coercive' (2007:21). Although this time focusing on ancestral power rather than God, Cole and Middleton (2001) have also explored the similar ways in which ancestral and colonial power are imagined and experienced among Betsimisaraka and Karembola. An analysis of mortuary rituals among these two groups reveals that 'ancestors and vazaha [europeans] are represented as both enlightening/empowering and enslaving' (Cole and Middleton 2001:11), with the same capacity to either make people flourish or annihilate them.

This idea of God for the Betsimisaraka is well captured in a proverb reproduced by Mangalaza, which states 'we humans, we are all like God's chickens; he alone knows the day when he will come and take us one by one' (1998:1). It is God that has the ultimate command over who gets to die, and, therefore, over time at its most absolute. State oppression in Mahatsara, as we have seen, is experienced as an impossibility to 'make oneself living' and 'pro-gress' (Keller 2008), endangering people's present, and, importantly, future lives. Like God, then, the 'environmental state' in Mahatsara—by curtailing movement in space—appears as having acquired a total command over time.

**Empty futures and self-fulfilled prophecies**

'I'd rather die tomorrow than die today' (*Aleo maty rahampitso toy izay maty androany*) is a well-known Malagasy proverb, often invoked by conservation and development organisations working in the country (present, for example, in a TAMS report; Borges Coutinho 2010). It could be argued that it has attained a sort of metonymic character among these actors when referring to Malagasy populations, used as it is to exemplify people's condition of living in the present as a result of poverty, and their consequent lack of a future orientation.

In the case of *tavy* farmers, the story links poverty to population growth and environmental degradation (due to increasingly shorter fallow periods), leading to further poverty and the impossibility to develop a long-term approach to agriculture, thus entrenching *tavy*. The result is the stereotype of subsistence farmers caught in a cycle of *tavy* leading to poverty leading back to *tavy*, unable to plan for the future and care for the environment. Indeed, the Project Design Document (PDD) for TAMS presents local communities as being 'locked' in 'unsustainable, intensive cycles of *tavy* exploitation that leaves a trail of degraded land as they move on', and justifies TAMS as a project which will 'enable subsistence farmers to break out of the downward *tavy*—poverty cycle they are currently caught in'. Tradition is also portrayed as partly responsible for this self-perpetuating cycle, since it is often claimed that the endurance of *tavy* relates to its value as ancestral practice (the PDD states that among other things, farmers practise *tavy* due to 'traditional beliefs and customs'). In temporal terms, then, *tavy* farmers' relationship to generational time seems the mirror image of global environmental discourse: where one faces the past, the other looks to the future. Through the discourse on future generations and 'Our common future' (WCDE 1987) conservation/development practice presents itself as the remedy to this lack of future orientation in the Betsimisaraka landscape. 'I'd rather die

tomorrow than die today' is therefore seen as the perfect portrayal of the temporalities which Malagasy people are thought to lack or be caught in.

We have seen, however, that this is not the case. Through the analysis of Betsimisaraka ideals of social reproduction, I have shown how people in Mahatsara do think of, and engage with, their futures. Following Keller (2008; 2015), in turn, I have argued that the social relations of *tavy* and more general pan-Malagasy ideas of generational growth combine to produce a particularly strong vision of expansion in space *and* time as a life ideal. Both the future and the environment, then, appear as particularly important issues for farmers in Mahatsara, albeit in locally meaningful ways.

In a sense, the discourse on a lack of future orientation and the 'poverty cycle' in which *tavy* farmers are caught is similar to the 'myth of marginality' exposed by Perlman (1976) in the late 60s, regarding Rio de Janeiro's *favelas* and their inhabitants, the *favelados*. In both academic and public discourse—and not just in Brazil but across Latin America in general—marginality during these years appeared as a phenomenon stemming from countryside migrants' mal-adaptation to city life, and thus as a result of the poor's own conditions and behaviours. This discourse produced a stereotypical squatter characterised by 'a lack of attitudinal pre-requisites' (Perlman 1976:136) for life in the city due to his 'parochial traditionalism' as country folk. Once this 'traditionalism' was passed on to generations in the *favelas*, it developed into a self-perpetuating 'culture', or 'cycle', of poverty', where cynicism and passivity made the poor unable to plan and care for the future. Perlman's study proved that not only did *favelados not* possess those traits associated to marginality (such as political apathy or internal disorganisation), but were, in fact, far from marginal. The *favelados* were rather 'tightly bound' (1976:131) and 'integrated into society' in a 'functional' (1976:147) way, 'albeit in a manner detrimental to their interests' (1976:131), as they were actively being marginalised by Rio's upper classes through exploitation and social exclusion. Where the 'myth of marginality' constructed 'poverty as a consequence of individual

characteristics of the poor rather than a condition of society itself' (1976:158), the opposite was, in fact, the case.

The 'myth of marginality' (Perlman 1976) shares important similarities with what we could term here as the 'myth of presentism' found in development/conservation discourse in reference to the condition of hand-to-mouth living among rural Malagasy or Betsimisaraka. Both myths are indeed articulated around a supposed lack—city skills in one case and concern for the future and the environment in the other—and they both situate 'victims' in particular 'cycles of poverty' that appear to function independently from the rest of society. The imagery of the 'cycle' is in fact a powerful device in representing a social problem as a timeless, and therefore permanent, self-referential totality. Like the poor in Rio's *favelas*, then, *tavy* farmers are represented as victims of their own practices, trapped between a traditionalist system—*tavy* and large families—and its reproduction into a 'downward cycle of poverty' from which they cannot break out on their own.

It must be pointed out that farmers in Mahatsara do indeed claim to live day-to-day due to a lack of economic resources, as Raivo's notion of '*krizy*' made evident in the introduction. Although I never heard the 'I'd rather die today' proverb, I could easily see how it might be employed. Ideas of living in the present, then, are too related to notions of poverty in Mahatsara. *Tavy*, however, does not appear here as the cause of such poverty, nor is poverty related to a lack of future orientation (at least not in relation to *tavy* —this is explored below), but it is rather *tavy regulations*, as Raivo made clear, that are seen as the cause of hand-to-mouth living. Like with Perlman's example, then, 'presentism' is not an inherent condition of subsistence farmers per se: as we have seen, the Betsimisaraka farmer is as much concerned with the past and ancestral practice as she is with bringing it over to the future through social reproduction. It is the current state in which farmers find themselves, as part of the wider socio-political context,

that forces the immediacy of the present upon them[93]. It is not so much, therefore, a matter of lacking a future orientation, but rather, of that particular orientation being denied in the present through the enforcement of conservation.

The 'myth of presentism' in Madagascar may somehow be seen as a 'denial of coevalness' (Fabian 1983), where *tavy* farmers are effectively situated outside the grid of the future by virtue of *their* supposed lack. Fabian (1983) employed the term to denounce the temporal distance established by anthropological representations with their object of study: anthropological writing, he argued, negated a shared space-time in the present, relegating 'the Other' to a primitive past. Conversely, we can see a similar form at operation here where future, rather than present, co-habitation is negated, simply because, for Betsimisaraka, the discourse goes, the future does not exist. As an empty or neglected future, then, it must be programmed and managed if we are to sustain 'our future generations'. The question bears on, of course, whose generations are exactly being singled out as future inhabitants through this kind of 'chronopolitics' (Fabian 1983:144) where the myth, as explored by Perlman (1976), becomes a political vehicle for interpreting, and acting on, social reality. I will return to this point in chapter 8.

Interestingly, in Perlman's (2005) revisit to the *favelas* 30 years later, she argues that the 'myth of marginality' gained such force after the 70s that it became a 'self-fulfilling prophecy': it was through policy aimed at the removal of the *favelas*, that the very conditions of 'disaffection' and 'disconnection' identified as the problem were 'perversely' created (2005:8). A similar thing seems to be taking place in Mahatsara.

As they prepared the offering for the *vonivao*, the *Tangalamena* and Soahary's mother, an elderly lady, discussed the reasons behind present

93 For a different take on a similar theme see Day et al. (1999) where the editors explore the ways in which marginal people who are denied a future transform it into an experience of freedom by purposefully living in the present.

catastrophes—most notably the year's bad harvest due to a rat infestation. These came about, they concluded, because young people did not respect ancestral custom and neglected their fields, especially as a result of the recent surge in gold digging, through which the young only satisfied their very present needs: it 'sustained the stomach' (*mitondra kibo*) the woman said. This new fleeting source of income was indeed generally seen as paradoxical: necessary and welcome in the present, but a problem for future harvests, since people did not have time to attend to their fields, and some of them had even turned productive agricultural land into digging sites (those by the river). The negation of a future in Mahatsara through prohibitions on expansion seem to be effecting the 'self-fulfilling prophecy' of 'presentism', as new generations do not, or cannot, care about the future.

As we saw, however, pasts, presents and futures are all implicated in Betsimisaraka thought as a unified flow that runs through the landscape. Although I was never told this explicitly, I would suggest that the denial of present and future reproductive capacity is also taking its toll on the past.

Rituals and religion, I was constantly told, are not what they used to be. The *vonivao* was a 'huge party' in the past that involved the whole community, Soahary's husband had told me as he lamented the loss of 'religion', *fivavahana*. Similarly, the spirit possession ritual at the sacred waterfall, *riana-soa*, had in the past involved cattle sacrifice, but in the present it was being preformed with a chicken that was killed even before making it to the waterfall, and eaten in the feast the night before the ritual. Contrary to ethnographic accounts of rituals performed at the *tavy* fields (see Sodikoff 2012a; Jarosz 1996), Mahatsara seems to have none (except for the taboo, *fady*, to work the fields on Thursdays). Finally, although Mahatsara (literally to make good/nice) acquired its name due to the healing properties of its waters, these, I was told, had long ago run out. Mahatsara, as it turns out, has lost its efficacy.

Rituals, as we have seen, are a particular powerful way of bringing together pasts, presents and futures. The decline in ritual practice in

Mahatsara may be seen in part as the result of poverty caused by the limits on agricultural expansion enforced by the 'environmental state'. This time/space oppression, embodied in the concept of *voatery*, seems to be curtailing the relationships that can be established both with the past and with the future, as people are confined to the present. Going back to Ingold's (1993) analogy between music in an orchestra and the melody of social life, it seems that, as pasts and futures drift apart, the landscape of Mahatsara is starting to lose its tune.

## Conclusion

In this chapter I have explored the social life of carbon in Mahatsara through the social and material significance of *tavy* for local (re)reproduction, a practice that brings together past, present and future relationships between people and these landscapes. Although carbon has not appeared explicitly in this chapter, we have seen how it may be thought of as implicated in a form of governance—the environmental state—which, through restrictions on expansion, contains people in both space and time and limits their capacity to 'make themselves living' in its widest sense. I have also shown that, while usually portrayed as lacking a future-orientation by the conservationist 'myth of presentism', people in Mahatsara do think, and care deeply about their futures. It is, by contrast, conservation practice, where we also find TAMS, that curtails the very futures it claims to enable by confining people to an uncertain present.

This is not a situation solely characteristic of Mahatsara. In her ethnography on labour relations in a global biodiversity reserve in Mananara-Nord, in northeast Madagascar, Sodikoff presents *tavy* farmers as 'feeling pinched or hemmed in' as a result of a decade of Park activity, 'unable to extend their land of descent by bequeathing land to their offspring' (Sodikoff 2012a:117). Similarly, we have seen how Keller's (2008) ethnography of villagers in the Masoala National Park provides fertile

comparisons for these kinds of experiences. Far from localised, then, the spatio-temporal effects of conservation on *tavy*-practising communities seem to be highly consistent. Sodikoff claims that this may be seen as an instance of 'time-space compression' (Harvey 1990), characteristic of contemporary forms of capitalism and enacted in this case by the 'nonextractive production of rain forest value' (Sodikoff 2012a:116). Through the concept of *voatery*, so salient in everyday life in Mahatsara and expressive of power(lessness), I hope to have shown that this 'compression' may also be thought of as a form of time-space oppression, in which carbon, as a novel form of value-production in these landscapes, also partakes.

In the next chapter I move on to the social life of carbon as (elusive) natural resource, through people's experiences of carbon labour in Mahatsara.

# Chapter Six: Carbon Matters and Experiences of carbon labour at the point of extraction

## Introduction

A key regulation of the Kyoto Protocol Mechanisms, including projects under the Clean Development Mechanism (CDM), is that emission reductions 'must be real, measurable, verifiable and additional to what would have occurred without the projects' (UNFCCC 2010:7). The fact that this 'new commodity' (UNFCCC 2010:3) is required to be *real*, is quite a remarkable thing, and already points to some of the specificities of carbon's material properties in these new markets. This goes beyond its 'fictitious' (Polanyi 1957) character as commodity (the fact that carbon dioxide, CO2—like land, labour and money—has not been produced for sale and exceeds its commodity properties) because, as some of the literature suggests, the end-product of offset projects—the emission reduction—is a sort of anti-matter. In his analysis on the materiality of carbon offsets, Bumpus (2011), for example, talks of the tonne of carbon dioxide equivalent, tCO2e, as a 'piece of counterfactual material nature' claiming that 'carbon offsets create a commodity and value out of a piece of nature—carbon dioxide in the atmosphere—that, if achieved properly, *does not exist*' (2011:616).

Most of the accounts of carbon's material properties, like the one above, focus on carbon credits as a peculiar type of commodity, and highlight its intangibility and abstract character (see, for example, Bansal and Knox-Hayes 2013). While insightful, I here want to take a step back and focus on carbon's materiality as grounded natural resource[94], by exploring

94 I use the term natural resource here in a broad sense, in reference to 'objects and substances produced from nature for human enrichment and use' (Ferry and Limbert 2008:3), and not necessarily defined as such by those engaged in bringing them about. My

the particularities of its 'extraction'. This allows me to bring to the forefront an often-neglected side of carbon sinks: on the ground 'carbon labour'. By this I mean the specific forms of labour that precede the work of turning carbon into commodity (explored in the next chapter), and that remain nonetheless central for this process, such as reforestation work in the case of TAMS. The emphasis on producing 'real' emission reductions already reveals a somewhat 'weird' property of carbon as natural resource. It would be highly unusual for, say, a mining company, to make a statement regarding the 'realness' of the minerals they extract. There is certainly something particular about carbon as natural resource, which seems to point to an apparent absence of material form. What implications, then, does the strange (im)materiality of carbon have for those involved in its production? And what difference does carbon as natural resource 'make' to people who inhabit African landscapes with long histories of intervention and resource extraction, as Leach and Scoones have asked (2015:2)? These are the questions that I aim to answer in this chapter as I explore experiences of carbon labour in TAMS.

As I argued in chapter four, local communities in forest carbon projects and other forms of commodified nature have mostly been explored through the lens of dispossession or displacement (for example, Büscher et al. 2012). In this chapter, by contrast, I turn to specific experiences of carbon labour among forest communities[95] in TAMS. In Mahatsara, over 60 men were hired to reforest degraded lands and about twenty of them, in turn, gave land to the project, in exchange for both reforestation work and carbon benefits/money. As we will see, these men's experiences of TAMS as a source of wage work were characterised by feelings of volatility in its widest sense, as temporary, intangible and detached from the local context. In turn, work in TAMS was consistently compared to the more grounded and

aim is to bring attention to carbon as an element produced through reforestation work in TAMS, since the question of labour is my main focus in this chapter.

95 Acknowledging these communities as heterogeneous and where power is unequally divided along lines of age, gender and status.

permanent jobs in the now extinguished local graphite industry, which operated in the area for over 50 years.

The production of graphite and of a carbon sink in Mahatsara may seem, on a first look, unrelated and contradictory. While one is the epitome of an extractive industry, reflected in the powerful image of the mine pit, the other stands as its antithesis, representative of everything non-extractive through the image of the tree firmly rooted to the ground. On closer inspection, however, both graphite mining and TAMS are ultimately concerned with the same element, graphite being an allotrope of carbon[96]. In turn, they both derive from the very same landscapes, and they have both been assimilated as wage work by men[97] in Mahatsara, albeit in significantly different ways.

Ferry's (2008) ethnography of silver and mineral mining in Mexico, reminds us that very similar types of substances that occur in the same spaces and are extracted simultaneously by the same people can lead to strikingly different ways of articulating and experiencing them as (natural) resources. Her example of the production and consumption channels, or 'trajectories', that silver ore and mineral specimens enter after they are extracted from the same Mexican mines shows how these two similar objects become evocative of very different temporalities: where silver ore is treated as a non-renewable resource and evokes a temporality of scarcity and progressive mineral depletion, minerals, by entering collections and becoming increasingly unique and identifiable, seem to 'extend their temporal horizons nearly infinitely' (Ferry 2008:69). Thus, 'the material conditions and qualities of minerals and ore', Ferry argues, 'make certain temporal constructions and experiences more likely' (2008:54).

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96 Allotropes are different structural modifications of an element. Although I employ the term here to tease out the connections and differences between carbon credits and graphite, I do it in a metaphorical way, given that the carbon of carbon credits is not a carbon allotrope but carbon dioxide, a molecule made up of carbon and oxygen ($CO_2$).

97 I focus largely on men's work experiences because, in Mahatsara, wage work is exclusively male. This dynamic continued with TAMS as no women worked nor gave land to the project in the village.

Understanding resources as the outcome of 'relations, practices and networks' that bring 'persons, things and materials' (Richardson 2014:4) together, I will focus in this chapter on the labour regimes, types of infrastructures and forms of exchange and production that were set up in Mahatsara in order to bring carbon into being in two distinct forms—as graphite and forest carbon. As we will see, carbon, in these two different guises, also gave rise to very different experiences of its production.

As TAMS came to a premature end, in turn, and 'carbon' failed to materialise in any locally expected way, experiences of volatility mutated into feelings of deceit, and the project became conceptualised as a 'scam', *fitaka*. A look at three other forms of failed exchange transactions that relate to natural resources will help me elaborate on the ways in which carbon in TAMS was marked by notions of intangibility, social distance and obscure forms of value production and exchange.

Taken together, these two cases allow me to tease out the particularities of contemporary forms of 'carbon labour' in Betsimisaraka landscapes, the way these relate to the (im)materiality of carbon as natural resource, and the political possibilities that opened up or closed down as a result.

I begin, in the next section, by providing a brief account of the various ways in which carbon as part of TAMS was understood in Mahatsara.

## The social lives of carbon in Mahatsara

In their analysis of the Western Area Peninsula forest (WAPFoR) carbon project in Sierra Leone, Leach and Winnebah present ideas about carbon, carbon-related money and concomitant elements such as climate change, as 'difficult-to-fathom' concepts for those communities involved—even if 'logical in terms of local experience' (2015:191–192). Carbon is thus sometimes explained as 'smoke from burning wood', as the 'mist you see above the forest in the morning' or as an object that Europeans need and are

eager to buy, not too dissimilar to the minerals or timber that have been the focus of foreigners historically (Leach and Winnebah 2015:192–193).

In Mahatsara, too, carbon meant different things for different people. Some of those with closer ties to the project, for example, could provide an account of carbon's role on the environment, and its links to foreign industrial emissions, even if the role of trees in absorbing or releasing carbon was not too clear. Thus, Sylvain, for example, who had worked for TAMS as head of a tree nursery (*chef pépinièriste*), explained carbon in 2011 the following way:

> It [the project] dealt with carbon (*carbone*) because the price of carbon is very high; outside Madagascar the environment is already damaged due to too much industry and the likes. And those abroad are the ones who provide funding (*mamatsy vola*) for the carbon and they say that in five years' time those trees we have planted will have released (*mamoaka*) carbon, although at the moment it looks as if just a little carbon has been obtained (*ahazoana*) because the tree seedlings don't seem to be growing'.

For many of those (men) who had worked in reforestation, or had given land to TAMS, on the other hand, carbon was simply something that was in trees and which 'those abroad' were interested in 'buying', *ilay carbone vangain'izareo avy any ampita*. Its actual properties or origins tended to appear somewhat irrelevant, and carbon was most often conceptualised as the object of the sale for which people would receive payment, generally understood as 'the price of carbon', *vidin'ny carbone*.

Some people, on the other hand, left carbon unexplained, and rather referred to TAMS' aim of turning *savoka* into (green) forest, *atao ala maintso*, as a result of 'foreigners liking green', *vazaha tia ny maintso*. When probed into the actual forms or meaning of carbon, for example, a man who

had given half of his land to the project claimed to not know, for it was something that had not yet been experienced, or 'lived', *zavatra tsy mbola niainana io*. Those who had not given land or worked for TAMS, in turn, the majority of women among them, tended to shrug when asked and claimed not to know what the project nor carbon was about.

There was an interesting understanding of what carbon credits, *crédit carbone*, were, however. As we know, credits are the end-product of a forest carbon project and are therefore supposed to flow from the forests of Andasibe to carbon buyers outside Madagascar. In Mahatsara, however, the idea of *crédit carbone* was equated to that of 'the price of carbon', often used interchangeably, and referred to the money farmers hoped to receive in exchange for carbon. While I do not know how this concept sprang up, I suspect it had its origins in the idea of mobile phone *crédit* (from the French) as available balance, and was therefore seen as money. It is important to point out that the idea of *crédit carbone* was used much more than that of just *carbone* and it could thus be tentatively argued that carbon was mostly apprehended as a form of exchange, where its features as natural resource were not all that relevant.

I have so far provided a brief account of the different understandings of carbon in Mahatsara. As we have seen, carbon most often appeared as an elusive element, or as Leach et al argue, a 'hard-to-fathom concept', its actual material properties or origins being often unknown or insignificant. Carbon's most important feature was not contained in the object itself, but in the kind of value it promised to farmers. In the next sections I delve deeper into the ways carbon—as elusive resource—was experienced in these landscapes. Before that, however, I present the landscape of Mahatsara as a 'resource environment' (Richardson and Weszkalnys 2014:7) and introduce the main theoretical approach I take in this chapter.

**The matter of resources**

Mahatsara is located 14 kilometres north of Andasibe, along the road that connects the town to the Andasibe-Mantadia National Park. The landscape changes substantially between the first half of the route, where the road separates charcoal fields from pine and eucalyptus forests, and the second, where the denuded hill sides of the *tavy* fields, topped by a few remaining trees, face the thick and extensive primary forests on the opposite side of the road. The Vakona Forest Lodge, a four star eco-hotel with its own lemur and crocodile parks, marks the half-way point between Andasibe and Mahatsara.

A few kilometres before reaching the entrance to the hotel, however, the tourist eye, captured by the luxurious and leafy landscape, may fail to notice the gate and barrier that lay on the right. They lead into an old mining plant, which is nowadays inoperative, except for some activity at the sawmill, where tree logs are stacked and processed from time to time. Both the mine plant and sawmill complex and the nearby hotel belong to the Izouards, a French family who settled in the area during the early 1900s. The adjacent village of Falierana, which also names the *fokontany* (the smallest administrative unit in Madagascar), is home to both present and past workers of the industrial complex.

The road that follows, after the hotel, is a bumpier, narrower and more unkempt path going all the way up to the various Park entrances. This path also leads to the old graphite sites, which are located inside the forest and have been closed since the early 2000s. The road is sometimes referred to by locals as *lalan'i Izouard* or Izouard's road, a reminder of the fact that this was a private road that was built by the colonial enterprise to aid transit of produce and labour between the mining plant and the forest excavations[98].

98 This part of the route is also an interesting palimpsest of local settlement and displacement, only visible, however, to those who can remember or spot its traces. The new village of Ambatofotsy, which precedes the entrance to the Park, displays the latest episode of displacement in the area: its villagers, having once lived in mining camps inside the forest, were relocated to the area of Ambohimarina as the camps had shut down, but had

All along this area, the land is filled with signs which somehow act as a script to read it, unfolding two different types of landscapes depending on whether one is local or a foreigner: signs in Malagasy warn those who can read them of prohibitions regarding access, whereas those in French translate the forest into a managed space filled with conservation interventions which guarantee its survival. TAMS is present here through signs which introduce key specific spots, such as the tree nursery at Ambodigavoala (below). Between 2011 and 2013, entering here, however, meant encountering a desolated landscape of dead and abandoned tree seedlings, nothing like the luxurious reforested hills that the sign promoted.


**Figure 12. Signs of TAMS tree nursery in Ambodigavoala. Photograph taken by author in March 2011.**

again been moved out in 2010 by Izouard, who, some claimed, needed the land for building horse stables.

**Figure 13. Tree seedlings inside the Ambodigavoala tree nursery. Photograph taken by author in March 2011.**

At a turn, about 2 kilometres from the '*barrière*', or main entrance to the Park where tourist passes have to be shown, a clearing in the otherwise dense vegetation by the riverside reveals a simple, wooden bridge. This is the entrance to Mahatsara.

The landscape between Andasibe and Mahatsara can be seen as a palimpsest containing some of the elements that make up what Richardson and Weszkalnys call 'resource environments':

> 'complex arrangement of physical stuff, extractive infrastructures, calculative devices, discourses of the market and development, the nation and the corporation, everyday practices and so on that allow (those) substances to exist as resources' (2014:7).

Natural resources, from this perspective, are not seen to just 'exist in nature' as bounded substances with 'essential qualities' waiting to be extracted and transformed (Richardson and Weszkalnys 2014:7), but are rather seen as the outcome of 'relations, practices and networks' that bring 'persons, things and materials' (Richardson 2014:4) together. In the landscape described above, graphite, for example, appears not just as the substance that is obtained from the mine pit, but also as the road that connects the pit to Andasibe, the village of Falierana and its inhabitants as graphite labourers, or the now derelict mining plant. This landscape, in turn, as malleable and 'perpetually under construction' (Ingold 1993:162), attests to changing resource environments that 'compete and overlap' (Davidov 2014:35). Thus, the same road that once made part of the graphite assemblage, is today vital for carbon, as it grants entrance to its tree parcels, some of which are at the same time located in past *tavy* fields. Similarly, some of the land that had hosted ANAE's alternative agricultural techniques (as part of TAMS) had recently become gold digging sites, as amused villagers commented. People, of course, as graphite miners, TAMS workers, *tavy* farmers or gold diggers, are another vital element that allow certain substances to become resources.

Richardson and Weszkalnys (2014) draw on a recent turn to questions of materiality in anthropology and geography which emphasise the 'liveliness' (Barry 2013:152), 'vibrancy' (Bennett 2010) or 'vitalism' (Deleuze and Guattari 1987:411 in Barry 2013:140) of matter. With special interest for the study of natural resources, matter, whether things or non-human nature, has been shown to matter: water can be uncooperative to its commodification (Bakker 2003), while metal may not be as 'docile' as expected (Barry 2013:139). By emphasising the relational and 'dispersed' character of resources, as Richardson and Weszkalnys do (2014:18), however, we can see that 'the competencies and capacities of things are not intrinsic but derive from association' (Bakker and Bridge 2006:16). Thus, Joyce and Bennett argue, it is not a question of seeing matter as having

powers or agency per se, but rather of identifying the 'effectivity' that objects (in this case substances) can exert in their own right depending on the 'position they occupy within networks of relations that always include human and non-human actors' (2010:5)[99]. In a similar way, Richardson and Weszkalnys propose the concept of 'resource materialities' (2014) to go beyond the qualities and agency of specific materials as resources, and rather situate them within 'assemblages' composed of humans, non humans, infrastructures, knowledges, technologies, practices, etc. Natural resources, from this perspective, appear as dispersed and relational. The efficacy of a given resource is thus not just contained in the substance per se, but is rather the outcome of such assemblages, which in turn, can have political origins and effects (Barry 2013; Mitchell 2011).

An interesting case in point is Hecht's (2012) example of uranium mining and trade in Africa and the contentious and political character of 'places, objects or hazards' being 'designated as nuclear' (2012:4). Rather than something intrinsic to nuclear objects, then, the 'distributed property' of what she terms 'nuclearity' (2012:14) is seen to emerge from socio-political and technical arrangements. This should not be seen as a negation of specific physical properties however: radiation and its effects, Hecht argues, are indeed a physical phenomenon. But these 'do not *by themselves* determine' (2012:15) whether and how things and places get categorised as nuclear, for their 'nuclearity' is the outcome of a series of techno-political questions and relations. Thus, uranium miners in Madagascar during the colonial era were not considered to be digging in nuclear sites, as these mines appeared as 'banal and peripheral, and more closely allied … to other forms of mining than to nuclear things' (2012:42). The effect was both a lack of security and health regulations and consequent illness.

99 This approach is therefore different, Joyce and Bennett argue, from other anthropological takes on materiality, such as Miller's (2005), where the material is considered effective 'only through the mediating agency of human consciousness' (Bennett and Joyce 2010:5).

Another important aspect of Richardson and Weszkalnys' concept of 'resource materialities' (2014) is that it directs attention away from resources as commodities and offers instead a fruitful way of exploring their 'becoming' (2014:12) in the first place. This framework, for example, allows Weszkalnys (2013) to explore oil's materiality through an appreciation of the extractive infrastructures that precede its commodification and conversion into monetary value. Thus, oil's perceived 'evil' efficacy or 'magic' (2013:270) contained in the notion of the 'resource curse' derives partly from centralized and capital-intensive forms of institutional management and extraction which allow oil and revenue to flow through illicit channels and to become socially and spatially detached.

Carbon, in this case, offers an interesting perspective through which to analyse particular 'resource materialities' (Richardson and Weszkalnys 2014) and their implications in social lives and labour in Mahatsara. Either stored in trees or in minerals underground, the materiality of carbon as relational resource in these two different forms will be shown to lead to strikingly different ways of organising and experiencing its extraction. My aim, in this sense, is thus to not take for granted or naturalise the (im)materiality of carbon as part of forest carbon projects, but rather to explore it through the different entanglements between people and things that were set up in Mahatsara in order to bring it into being. In the following sections I focus on regimes of labour, infrastructures and forms of exchange and value production that were established for that purpose.

## Carbon labour in the forest

In this section I introduce the contemporary job situation in Mahatsara, which, as we will see, is characterised by a sense of temporariness. I then present a history of graphite mining and the ways this source of work is today conceptualised in the village. Interestingly, TAMS as a forest carbon project in Mahatsara did not just propose the return of the

primary forest or the fallows, as we saw in chapter three, but was also—and fundamentally—posed as an initiative that would bring back the permanence of past work experiences. This as we will see, never happened.

*'Asa Maharitra' or Work that lasts*

The '*terrain*' of Mahatsara is a dusty, open area at the bottom of the village, which, being surrounded by the hills in which houses are perched, acts as the main grounds or village square. It is usually taken over by children most of the day, who use it as playing area, and sometimes by young men in the early evening as they gather to play football. Located on the route between the main road and further trails to more inland villages, it acts as the central point of information for local events, as any relevant notices are put up on a wooden wall of one of the most centrally located houses. Meetings organised by outsiders, such as ANAE, also take place on this spot.

In April 2013, an important meeting took place, judging by the exceptional number of men who attended. For about a week, a notice had advertised the gathering, in which, it was stated, nine men would be recruited as patrol guards for the new *Corridor Forestier Analamay-Mantadia*, CFAM (Analamay-Mantadia Forest Corridor), developed by the nearby mine of Ambatovy in partnership with the Regional Forestry Service, CIREF, and Conservation International, (CI). Word had already spread around the village days before the meeting, and excited conversation abounded regarding this new work opportunity and the recruitment process, which would involve a test among selected candidates. On the day, about fifty or so men sat on the ground, intently listening to the event organisers—among whom was the *Tangalamena*—on how the project and recruitment process would work. As usual, (the few) attending women (including myself) sat at the back, where the voice of presenters was often lost to crying babies and children's racket.

The meeting was an informative event regarding the soon to become protected area zones, their corresponding access rules and infringement fines, and the job opportunities it was going to create: 9 males, from 18 to 45 years, who could read and write in Malagasy and knew the area well would be selected to patrol the new 'surveillance zones'. They had to be willing to learn new things, to work Saturdays, Sundays and holidays, to sleep inside the forest, and had to be healthy. In return, contracts of 3 to 5 months would be established, after which new recruits would be taken on, for a total period of one year. The wage, *karama*, would be 5000 *Ariary* (about £1) per day, plus 2000 *Ariary* (£0.40) for food per working day.

As the meeting came to an end, the buzz of the previous days died out and was replaced by a bitter-sweet resignation: as it turned out, only four men from the area would actually be taken on, since the nine positions offered were to be shared between the municipalities of Andasibe and Morarano. The first comment made during question time was evocative of this general feeling, as an elderly man from a nearby village stood up and argued that as much as the environment needed protecting, so did people need to make a living. He then requested, in various rhetorical ways, what he qualified as *asa maharitra*, or long-term work (work that lasts).

All the next questions revolved around the number of workers and the recruitment process. Someone claimed, for example, that although Mahatsara was the centre of the area, surrounding villages should not be ignored and suggested that men were chosen equally from Mahatsara, Ranobefoza, Andranomahintsy and Ambolomborona. Another man commented on the limited numbers of posts and how this was insufficient since he had 'many young sons, and they all need to work', while someone complained on the age restrictions, claiming that 'those who are 50, for example, know the forest best'. To my surprise, it were not the new prohibitions on land access that people seemed to resent, but rather the low number of job positions and their temporariness: at best, one could hope to obtain a well-paid job for three to five months, and then what?

I here want to draw attention to the relevance of the first claim made emphasising not just the need for work, but for work *that lasts*. This comment can be clearly located within a more general discourse in the area which points to the significance of past long-term wage work, unequivocally identified with the now extinct industry of graphite, or *manjarano*[100].

Closed in the early 2000s, the local graphite industry has not just left resilient imprints on the landscape, but also on people's memories and present lives. No man in Mahatsara over thirty years of age will fail to mention their engagement with one (sometimes both) of the two local graphite enterprises in the area. These past work experiences, in turn, extend to the present in the village as they are embodied in daily non-agricultural practices, such as carpentry or ironmongery. As he cut and polished some boards to build a new granary, for example, the *Tangalamena* relished recalling the stories of how he was trained as a carpenter by Izouard when he was 15, for whom he worked for 43 years. These should not be seen, however, as idealised experiences of work: in the same story the *Tangalamena* would also recall how, in its beginnings, the industry was built through indentured work and how workers were often physically punished.

Graphite mining began in the area shortly after colonisation, in the early 1900s, and went through a series of fluctuations where businesses would close down and reopen years later. These instabilities were generated by a global market in graphite that would expand or contract in particular historical periods: in 1916, for example, graphite production boomed as it was required by French and British 'war factories'[101]. By 1917, no less than 3000 tons were produced in the region of Moramanga alone, concentrating 6000 labourers—two thirds of the working population—in various camps or

100 Although people in Mahatsara are usually identified as subsistence farmers, *tavy* is just one of the varied economic strategies that people engage with, others including wage work, petty trading (specifically among women) and, during my time in Mahatsara, small-scale gold mining.

101 Province de Moramanga, Rapport Economique, 1916, FR ANOM GGM 2D, c.168

'*toby*'[102]. With the end of WWI in 1918, the industry suffered its first crisis, reaching the production low of 257 tons in 1919[103]. From all the existing enterprises in the area, only three continued production, to retain 'the labour force in case of recovery'[104]. A recovery did take place around 1924[105], but ended prematurely with the Great Depression in 1929[106]. After the 1930s the industry continued at a steady pace over the years. From the early colonial enterprises operating in the area of Andasibe, only 'Compagnie Arsène Louys' made it through, by alternating graphite production with logging. It is locally claimed that one of his own foreign workers saw the opportunities that graphite mining afforded, and some years later decided to set up his own graphite business—'Etablissement Izouard'—in the nearby village of Falierana, with its main mines located in what is today part of the national Park. These two enterprises lasted until the early 2000s, when national production began to decline due to competition from Chinese producers and the increasing costs. A recent assessment of the graphite industry in Madagascar notes an important resurgence of production in other areas of the country (Yager 2014).

The significance of this source of work—variously referred to as 'Izouard', 'Louys', 'etablissement' or '*orinasa*' (factory)—seems to draw a large part of its meaning from its contrast with contemporary job opportunities, considered temporary, or on and off, *tapa-tapaka foana*, and unreliable. During one of my walks between villages I came across Da, a middle-aged local man with whom I shared part of the route on our way to Andasibe. He was excited to hear that I was interested in TAMS, and told me he had been one of the team supervisors during the planting work. After asking whether I knew when the carbon credits were coming (they had had been waiting for years, he said, and it was rumoured that it was the

102 Province de Moramanga, Rapport Economique, 1917, p. 7-8, FR ANOM GGM 2D, c.168

103 Province de Moramanga, Rapport Economique, 1919, FR ANOM GGM 2D, c.168

104 Province de Moramanga, Rapport Economique, 1918, FR ANOM GGM 2D, c.168

105 Province de Moramanga, Rapport Economique, 1924, FR ANOM GGM 2D, c.168

106 Province de Moramanga, Rapport Economique, 1930, FR ANOM GGM 2D, c.168

government who had messed up), he explained that the problem in the area was that work was temporary, that it did not last: as the mines had closed down and TAMS had stopped, everyone had gone back to *tavy.*

The conceptualisation of past work for Izouard or Louys in temporal terms among men in Mahatsara is particularly revealing of its significance as long-lasting and permanent. While it most likely offered a continuous yet intermittent source of work opportunities, it is most often articulated as an uninterrupted period of time significant for its duration. Like the *Tangalamena* above, who claimed to have worked for Izouard for 43 years, Germain, a local of Mahatsara in his late thirties who complements a small parcel of *tavy* with local alcohol brewing and gold digging (and who also worked for and gave land to TAMS), explained his work for the mines in the following terms:

> 'I worked for Izouard for 22 years, but then unemployment came so it [the job] stopped. I didn't want to stop working but the graphite business didn't work well anymore and that's why it stopped, up till now both Izouard and Louys are still closed'.

The importance of wage work in the graphite industry must be understood as a semi-regular source of income which would have secured livelihoods at times, 'luxury' items at others, and the possibility to re-invest in agriculture at times in which relaxed enforcement allowed it, as it offered the possibility to hire workers in order to expand the area under *tavy* cultivation. Interestingly, it does not seem to have attracted an unsustainable number of labour migrants—at least not for workers themselves—as it is claimed that during this time everyone (every able male, that is) was employed by either Izouard or Louys.

This idea of long-term work finds a clear contrast with the current labour markets available to those young males who are just coming off age and beginning to search for work in Mahatsara. Here, most of the available

positions in hotels, the nearby mine of Ambatovy or the National park (with tasks such as road repairs before the tourist season begins) are temporary and seasonal. Consider the case of Joe, for example.

Joe is in his late teens/early twenties and has lived in Mahatsara with his mother and siblings since the early 2000s. His father worked for Izouard in the mines of Tsaravonoina, but died some years ago. Joe is a resourceful person who has worked in every possible job that Andasibe would offer to a local, non-formally educated person.

I met Joe during my first weekend in Mahatsara. He was kind and attentive, and having heard that I was interested in local stories, *tantara*, he quickly made himself noticed saying there were many stories around. For the next few days he shadowed us, and took us to various village spots of interest, such as an artisanal alcohol brewery or the local smiths. At our request, he became our local assistant on occasions, such as travelling to distant villages or helping us carry food supplies from Andasibe to Mahatsara. A few weeks after our arrival to Mahatsara, Joe got a job as builder/general handyman at the Andasibe Hotel. His manager at the hotel was a well-known man of Merina origin who had previously worked at the Vakona Forest Lodge (Izouard's eco-hotel). During his years in Vakona he employed many men from Mahatsara and surroundings in manual work, and continued to do so in Andasibe Hotel, often also buying produce from women in the village, such as beans. The type of wage work he offered was temporary, as in the case of Joe, whose main task was building a few structures in the first months of the hotel's opening. Joe had also worked previously, both for TAMS and the mine of Ambatovy, for short periods of time. Being too young, he did not own land (at that stage anyway) to give to TAMS. By the time of our second return to Mahatsara, he had relocated to a nearby village with his new girlfriend's family. There was no more work in Andasibe Hotel, he said, so he had now turned to *tavy*, both in his mother's and his own land and, importantly, to the new local livelihood strategy: gold

digging. Although he had entered the CFAM selection process, he had not been successful.

We can thus begin to see that the situation and experience of men's wage work in Mahatsara has radically changed over the last decades. Where the previous generations enjoyed a large and steady source of job opportunities, today's generation is characterised by precarious work: temporary and insufficient[107]. In general, it means that families in Mahatsara can only rely on the small *tavy* parcels they hold and the various other economic strategies that have been mentioned above, such as gold digging, for as long as they last (usually a few months). Wage work, on the other hand, has become a complementary yet unpredictable activity[108]. At the intersection of these two forms of work experience we find TAMS. As we will see, the project was presented to people in Mahatsara as an opportunity for well-paid, long-term work, and thus as a remedy to the precarious contemporary situation.

*Working for TAMS in Mahatsara*

In its initial stage (2006-7), TAMS employed 60 men through the organisation SAF-FJKM[109] (in charge of this specific area) to reforest 140 hectares of land inside the Park. Workers were arranged into groups of ten and were each supervised by an appointed local team manager or '*chef d'équipe*' and a '*technicien*' from SAF. As a CI operative liked to boast, TAMS offered some of the highest wages in the area and was thus highly regarded by workers, who indeed often acknowledged how well work for TAMS was paid. At a later stage, around 2009, when more land was needed, 23 men gave part of their land to the project to reforest 40 hectares. They gave

107 This is, of course, not just a local situation but a widespread effect of contemporary precariousness in labour markets globally (Beck 2000).

108 In general, young men do not migrate to other areas in search of work, nor do gender dynamics change significantly with this type of precarious work.

109 SAF-FJKM is the Protestant Church's branch for development in Madagascar. It operates nationally and has regional presence through its office in Moramanga.

between 1/2 and 3 hectares each, depending on how much they had or were willing to give, on the promise that they would receive carbon money within the following five years and, most of them claim, work.

The promise of work is a disputed element in TAMS. Most farmers, for example, claim that the only way of accessing this second stage of work was by giving land, although this is contradicted by official TAMS sources. Others claim that they were told work would last for the whole thirty years of the project's lifespan, and that its wealth—as a source of money and work—would be passed on to their children. In turn, a report on TAMS by Holloway dated June 2007 hinges on this aspect, as it is claimed that 'Conditions upon which people are prepared to negotiate transfer of carbon rights almost unanimously include: ... secure employment to restore and protect the natural forest for the 30 year duration of the project'. On the contrary, the document 'REDD, A casebook of on-the-ground experiences' produced by TNC, WCS and CI in 2010 and which features TAMS as case study for 'Involving and Benefitting Local Communities and Indigenous Peoples' states that

> 'the majority of jobs created are expected to be temporary, occurring in the first 9 to 12 years of the project, though some employment related to ongoing maintenance and monitoring will be supported throughout the life of the project, along with employment related to sustainable livelihoods' (2010:45).

Although the Director of SAF-FJKM in Moramanga claimed that work had lasted for a total of three years—21 months of reforestation and 12 months of maintenance—this did certainly not translate into a permanent source of work for men in Mahatsara, who generally claim to have worked for TAMS for intermittent short periods over the course of those three years, sometimes totalling only five months of work on the whole.

During the second stage of reforestation, and in the absence of an official agreement with the Government of Madagascar on the exact terms of land and benefit provision, a 'temporary contract' was signed in 2009 between farmers, ANAE as project manager and the Regional Forestry Service, CIREF, at the request of the BioCarbon Fund. This document stated that land was being 'offered' to the project for a 30-year period during which farmers committed to leaving the reforested area intact. In return, it was claimed, a final contract would be signed stating the actual benefits that they would receive. This, however, never happened, nor was there any clear understanding within TAMS organisational structure on how the hereditability of jobs or land would work out during this long period of time. As this second stage of reforestation came to an end, promises of permanent work evaporated as TAMS began to break down and funding was intermittently cut[110].

The importance of promises of long-term work in TAMS, at least in Mahatsara, cannot be overstated. In an area where the only stable source of wealth in the present—the expansion of arable land for *tavy*—risked unaffordable fines or prison, and where no realisable alternatives, such as wage work, had been available since the mines closed, for men to have given half their land for a conservation/development project must have taken some very convincing arguments. We can thus being to see the significance of the call for *asa maharitra*, or 'work that lasts', in the CFAM meeting: it responds to past experiences of permanent, productive work and contemporary feelings of precariousness (both temporal and limited in numbers) in the area.

TAMS began as a project that explicitly appealed to a future of permanence, somehow a return to past working lives. During its short life,

110 The intermittence of TAMS and its employment structure was something also recognised at higher organisational levels. Mino, the director of ANAE, recalled how bureaucratic and organizational 'blocks' in TAMS' higher levels translated into 'grave' social problems in Andasibe as a whole, as credit given out by local businesses to TAMS workers on the expectations of wage payments could not be repaid due to severe delays, and ended up disrupting the local social context.

however, it transformed into its very opposite, as the unfulfilled promise of work coupled with that of undelivered carbon money. Cogently contained in the following comment made by one of those men who worked and gave land to the project, the hope of permanence mutated into feelings of having been cheated, as neither work, income nor even carbon itself materialised:

> 'they told us to give land and they said: this land you will plant with tree seedlings and you will work for 30 years so that you don't have to come and go around looking for work, (*tsy mampivezivezy anareo hitady asa*), although after planting them we haven't been employed even once during this year, and we are baffled … have they deceived the population (*mamita-bahoaka*) or is there really that carbon?; that carbon we still haven't seen up to now though'.

In this section we have seen how men's experiences of labour in Mahatsara are today characterised by feelings of temporariness in contrast to the more permanent and stable work that the graphite industry offered in the past. Although TAMS promised long-term work and carbon money (in exchange for land) it soon transpired that these promises would not be honoured, sparking feelings of deceit. This last quote, however, also points to something more fundamental about carbon labour in TAMS: the doubt over the existence of carbon itself. In the following section I explore feelings of deceit and their relation to carbon's (im)materiality as natural resource, as I compare it to three other cases of failed exchange transactions relating to natural resources (graphite, gold and mercury). We will see how the notion of deceit does not just relate to the failed promises and temporariness of TAMS, but can also be located in issues of intangibility, social dislocation and obscure forms of exchange and value production of carbon as natural resource.

## Seeing a scam instead of carbon

During my first stay in Mahatsara in 2011, people awaited the carbon credits/money in the hope that they would eventually arrive. Word was that there had been problems with either the government, or, most generally, the funders, *mpamatsy vola* (explored below), but when I asked whether the project had ended or was at a halt, I usually got the same hopeful answer that it had been stopped temporarily but the money for the carbon would eventually arrive: *mbola ho avy ny crédit carbone*, '*nijanona fa mbola hitohy*'[111]—'the carbon credits will come', 'it has stopped but it will continue'.

At the beginning of 2012, however, some people were already beginning to question whether everything had actually been a scam. Faly, a local smith who had worked in the initial planting stages but had not given any land away (maybe that is why he need not hold on to hope) and his wife Hanta put it this way:

> 'What they were giving us in exchange was this: if you give land, you will work with us, we will get you work so you won't have to struggle (Hanta: scam), that's what they said … That's how they tricked us, but all that stuff, all that money, is missing'.

In 2013, however, this feeling had become the general rule in the village, and the most common word associated with TAMS when I enquired was consistently that of scam or deceit, '*fitaka*' '*mamitaka nataon-jareo*'[112]. After years of patiently waiting, and with no signs of TAMS coming from anywhere, people felt that the whole project had been a scam and they had been cheated into giving their land. The problem, of course, was that while

111 This contrasted sharply with those organisations in Andasibe—the FA's—who insisted TAMS was over.

112 It is important to point out that although the scam commentary was generalized, I never heard the Tangalamena qualify it as such.

knowing that TAMS had ended and would not provide any benefits, people were scared, *matahotra*, to clear the land, because of the contracts they had signed when the project began[113]. When asked what they would do, no one had a consistent answer, and at best they acknowledged in laughter that they would eventually have to clear the land, and, shaking their heads, would call out the word scam, *fitaka*.

It could be argued that feelings of having been cheated resulted from a failed exchange transaction due to one side's default. Although the wording of the contract signed with ANAE and CIREF stated that the land subject to TAMS was being offered, *manolotra*, farmers' own narratives constantly highlighted a notion of exchange. Indeed, although the most common word employed by farmers when referring to this transaction was that of giving, *manome*, land it unequivocally involved an element in return, whether work or carbon credits/money, or both. As we saw above, carbon was most often articulated either as the 'price of carbon' or as the 'carbon credits' that farmers were owed by the project. The notion of 'scam' or deceit does not simply emerge from an economic rationality, however, but points to a particular 'morality of exchange' (Parry and Bloch 1989), where it is perceived that the failure to fulfil one's obligations was intentional and done in bad faith—that is, that one of the parties never intended to settle the debt (Graeber 2011). I suggest, however, that the idea of *fitaka*, or deceit/scam, in this case does not derive its meaning solely from a notion of intended (and thus illicit) default, but also, and importantly, attends to carbon's particular (im)materiality, both through its social detachment and its intangibility/invisibility. Three other failed or illicit exchange examples that in turn relate to particular substances or resources—money/graphite, gold and mercury—will help me elaborate on this.

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113 The validity of these contracts was also a disputed element within TAMS' different organisations. When interviewed on this matter at this stage of the project, CI, for example, claimed that these contracts were still in place, whereas ANAE acknowledged that without the delivery of TAMS' promises and with the apparent liquidation of the project, it did not make sense to ask farmers to stick to them.

In 2011 money that Izouard owed people disappeared. As it turned out, men—or their families if already deceased—in Mahatsara were to receive their pension money from a lifetime of social security payments they had made to the national scheme, CNAPS, through their work for the mines. The *Tangalamena*, for example, had contributed for 43 years, until 2009, and Rakoto, who owns one of the two shops in Mahatsara, for 20. The money—around 18 million ariary (circa £5000)—however, had not arrived and there was general speculation that it had disappeared into the pockets of a locally based middleman. Being the leader not just for ancestral matters, but also for administrative ones, the *Tangalamena* travelled to the provincial capital of Toamasina in various occasions as village representative during the following months, as he took the case to court. Every time he came back from a trip to Toamasina and narrated the (slow) development of the case to everyone else he would appeal to their legal 'right' to the money, or *zo*—a concept that also denotes honour and dignity (Althabe 1969:304), and which I explore below. Soon before I left the field, it seemed that the case had finally been settled, as news arrived that the money had finally been released and could be collected in Antananarivo. What is particular about this case is that it was never conceptualised as a scam. Although I only heard the *Tangalamena* appeal to this notion of *zo*, the approach generally taken—that of delegating the *Tangalamena* to solve it through legal means—already points to an important difference with the case of TAMS. I will come back to this below.

Another case characterised by trickery but not conceptualised as a scam was one related to the surge of gold digging in 2012-13. Although small co-operatives of villagers tended to be formed for extraction, the tiny gold grains obtained were sold individually to particular 'buyers', *mpividy*, who came to digging sites or were based in Andasibe. The problem, however, was that these men 'stole', *nangalatra*, from villagers because the scales buyers used to weigh the gold were tampered. Again, an incident that a priori could have been understood as a form of 'deceit' was seen

otherwise, this time as outright theft. Before elaborating on this, I present a final example, one that was indeed conceptualised as a scam or *fitaka*.

It is a story I was repeatedly told in Mahatsara, and it concerns a mysterious character, the 'Rasta'. This man had apparently appeared in the village claiming that there was mercury in the rivers and land, which could become a great source of wealth for those who were willing to invest. He had tricked people into giving him money, promising to double it, and had then disappeared, leaving no trace. Part of the 'Rasta's' trickery, it is claimed, involved a pair of 'x-ray glasses' and other mysterious devices through which he claimed could locate the mercury.

The similarities between this final example and TAMS are particularly revealing of the kind of aspects that make certain incidents be seen as scams, and not others. I suggest that, at least in this case, deceit points to notions of invisibility/intangibility, social distance and obscure forms of exchange and value production, and, therefore, to the particular 'elusiveness' (see also Onneweer 2014) of both carbon and mercury. These two resources in fact share some important elements in the way they were understood in Mahatsara.

Just like the various organisations, big and small, which had arrived in Mahatsara claiming to see such great potential on the land through a resource that was both hitherto unknown and unlocatable, so had the 'Rasta' appealed to an invisible source of wealth that he alone could detect. It could be argued, in fact, that carbon and mercury, as invisible and intangible substances of great potential, shared some important elements with Malagasy understandings of potency/generativity encompassed in the notion of *hasina* (Graeber 2007; Feeley-Harnik 1991) and its embodiment in spirits and charms. As Graeber argues, *hasina*, or the (invisible) 'possibility for creativity, action, or growth' is embodied in spirits that are, in turn, 'invisible, formless, nameless, incorporeal' (2007:36). This invisibility seems to be, in fact, a key feature of *hasina* when contained in the specific objects or ingredients of charms, because, in Graeber's view of this ritual logic, 'it

was the fact that the ingredients of charms were hidden from sight that gave them their capacity for action' (Graeber 2007:37). Invisibility and intangibility, then, might have played an important role in generating these substances' potential in local imaginaries—a potential that, unlike *hasina*, however, had to be channelled through extra-local actors and one that, ultimately, was never realised.

In turn, just like the Rasta, who had come and gone out of nowhere and was impossible to track down, so did TAMS lack a cohesive presence in Mahatsara, attending more to rumour and the capricious agency of its distant actors. There is, in fact, an interesting parallel between the social distance of the Rasta and that of TAMS and its structural organisation as understood in Mahatsara. It is surprising, for example, that the ethnicity of the Rasta was never mentioned—one of the most straightforward ways that Malagasy people use to categorise each other. Instead, he remained a (nameless) 'Rasta', a somewhat peculiar and rare type of person[114]. In a similar way, agency in TAMS among farmers' narratives always seemed to be located at a distance: the arrival of work or carbon credits, or the very continuation of TAMS itself, always depended on either the government, (in a moment of transition and high volatility), or most notably, on the elusive concept of the foreign funder, or *mpamatsy vola*. This concept was widely employed by people in Mahatsara when commenting on the interruptions and rumours regarding the arrival of carbon money. Like the 'Rasta', it lacked a specific social location, and was removed from the immediate, even national, landscape.

Taken together, I suggest that these examples—all of them relating to illicit or failed forms of transactions of particular substances or resources—

114 This is a marker I often heard in Madagascar being applied to young men of Malagasy origin who do not necessarily have dreadlocks, but depart from the traditional look by having, for example, longer hair. I heard it in the specific context of young (elite) males with close ties to European females, something highly uncommon. Rasta, from this perspective, appears as a marker of distance from Malagasy sociality/normality. It was not, however, a negative marker, but just one of elusiveness/rarity: of men hard to pin down or locate as exclusively Malagasy.

provide important clues as to why only some came to be identified as scams, and the reasons this relates to carbon's materiality as natural resource, as I detail below.

Questions of social distance and detachment, for example, were not present in the case of Izouard and the missing pension money. As will be explored below, the 'resource materiality' (Richardson and Weszkalnys 2014) of graphite meant that it remained significantly entangled with the local context, and it was thus that the *Tangalamena* could recourse to legal means—through action in Andasibe, Antananarivo and Toamasina—to recover the money that was rightfully theirs, their *zo*. In his discussion on credit and debt, Graeber (2011:337) points out that, historically, while credit among communities was largely based on trust, as it spread to strangers it often led to scams, a fact that highlights the connections between scams and distance: surely, the impossibility to track down an outside debtor must have played in favour of this type of intended deceit[115]. But the notion of *zo* employed by the *Tangalamena* also offers an interesting insight into the social relations of exchange through which this particular situation was framed. Althabe (1969) has argued that *zo* for east-coast Betsimisaraka refers to a person's honour or dignity, and is an inalienable element attached to the human condition. While inalienable, zo can nonetheless fluctuate in a quantitative manner, and is especially employed in situations of wage work or servitude, where 'every subordination, everything that marks a condition of servitude, entails a deterioration of zo' (1969:303). *Zo* is in fact a 'permanent reminder' of a community that has been born out of its equal distribution, and every act that puts into question another person's *zo*, Althabe argues, means to forget such community, and destabilise equality. Part of its meaning thus derives from questions of reciprocity (1969:302), as when an appeal to one's own *zo* is employed to

115 I am in no way claiming that TAMS intentionally aimed to deceive people, although another social researcher with previous experience in TAMS did suggest that deliberate deceitful practices had taken place elsewhere (through one of the local organisations) in order to secure project land.

establish some form of 'dialogue' or social relation where reciprocity is seen to have been disrupted (as in the case of coloniser-colonised). We can see how this notion of *zo* would fit in with the case of the missing pension money, as the reciprocity of employer-employee as a form of exchange had been fractured. An appeal to the money as *zo* may therefore be seen as an attempt to restore this imbalance, and at the same time, as a call for, and reminder of, a common or shared form of sociality between workers and Izouard.

The case of the tampered scales in gold sales, on the other hand, may or may not have been socially detached (it seems that the buyers were from Andasibe) but there might have been other buyers from the regional or national capital. In this case, I suggest, it was the tangibility and visibility of gold, extracted and manipulated by villagers themselves, and the immediacy of the transaction, that favoured an understanding of theft over that of scam.

By contrast, both carbon and mercury only existed as potential, yet elusive and invisible, resources that never materialised and which could only be accessed through dubious actors and hitherto unknown processes of exchange. It is in fact not difficult to see how, in the context of TAMS, the notion of *mpamatsy vola*—literally money provider—might have appealed to a sort of invisible capacity to create value out of nowhere (or at least from an unknowable source), a feature that can be evocative of trickery in Madagascar and elsewhere (Bloch 1971:31; Alexander 2004). We can therefore see how the notion of scam was thus not just related to a failed exchange transaction, but also attended to questions of invisibility, intangibility, a dislocation from the local context and obscure forms of value production and exchange.

Experiences of labour in TAMS thus seem to point to an idea of volatility in its widest sense. This, in turn, contrasts with the much more tangible experiences of work for Izouard, as both permanent and socially accessible. In the next section I return to the parallel between graphite and carbon to suggest that these two different experiences of 'carbon labour'

relate to the materialities of each resource, that is, to the different entanglements between people and things that the extraction of carbon generated in each case. I finish by exploring the connections between resources, their materiality, and the political possibilities they entail.

## Carbon matters

I argued above, following Richardson and Weszkalnys (2014), that a productive way of understanding resources is as the outcome of relations and practices that bring people and things together and not as just bounded substances (Richardson 2014:4). From this perspective, resources' 'specific chemical and physical properties' (Richardson and Weszkalnys 2014:16) appear as just one element in the assemblages that bring them into being. This element, however, has the capacity to affect both the form such assemblages take and the way they are experienced by those involved in them. The specific material properties of substances are thus both effective *and* affective, but cannot be considered in isolation from the rest of the relations that make up resources as 'distributed things' (Richardson and Weszkalnys 2014:8). Following this approach, we can therefore begin to tease out the differences between carbon as part of the graphite industry and as part of TAMS in the landscape of Mahatsara, as well as its effects in local labour and lives.

The idea of permanence associated with Izouard (or Louys) is not only relevant in terms of long-term work, but also in the ways that the industry, its infrastructure and labour regimes, were entangled with local lives. The extraction and transformation of this carbon allotrope involved the opening of mine-pits in the forest; the establishment of '*toby*' or camps in those locales where whole villages were set up[116]; the opening or 'breaking' of a

116 This is similar to Walsh's (2012) analysis of sapphire extraction and conservation work in the Ankarana region in Madagascar, as he points out that one of sapphire mining's key characteristics is that it can support a much larger number of workers than conservation work. We can thus see how, generally speaking, carbon sinks as

road which did not only facilitate the transportation of the allotrope but which also became a central element in social lives as it connected people to each other and to Andasibe; it involved the establishment of a mining plant in Falierana which required a constant workforce that settled in its vicinity and the construction of his own home by the plant, presumably to supervise operations. All of Izouard's activities, in turn, did not just settle on a vacuum, but rather on a landscape that had already been dwelt in (Ingold 2000)—lived, worked and died in. Many tombs today are still located on Izouard's land, the main difference with those inside the national park being that the former do not seem to need any type of authorisation to be visited in funerary rites. Maybe unknowingly, his presence extended to ancestral matters, as when he took charge of the fines that people were subject to if caught doing *tavy* illegally (this, of course, need not be seen as an altruistic act, but as one geared towards sustaining a much needed workforce). His comings and goings along the road that connected the mining plant to the forest camps, and his involvement in extraction operations, led to his involvement in social relations with his workers, such as lunch or dinner, as the *Tangalamena* recounted, changing from the appellation 'Izouard' to that of 'Jean Claude'. In sum, then, graphite mining did not just extract carbon allotropes from underground, but forged a series of socialities in those landscapes that brought graphite into being. Also, by locally forging a life and a line of descent, and thus setting roots in the landscape, Izouard came to be seen as sharing particular attributes with local populations—this being one of the key ways of understanding attachment to land and origins among people in Madagascar (Bloch 1971; Feeley-Harnik 1991).

The story with TAMS is very different. What is left of it in the landscape is a few rusty signs and some indistinguishable trees. This, of course, does not mean that they are insignificant: they are the unwelcome remnants of

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conservation projects do not require an extensive labour force, whereas mineral extraction does. This already points to an important difference of these resource materialities.

something that is seen as unproductive—or a scam as we have seen—and yet remain in place because of people's fear of clearing the land. But it does attest to the lack of local attachment that the production of carbon entailed in this case. As I have explained above people were employed by SAF-FJKM, an organisation that has an office about 15 kilometres from Mahatsara, which is, however, rarely used, its closest headquarters being in the regional capital of Moramanga. I never experienced SAF-FJKM's presence in Mahatsara and only ANAE, with a small local office in Andasibe and its general headquarters in Antananarivo, visited the village, twice during my stay. CI and the rest of the national actors are located in Antananarivo. The *mpamatsy vola*, in turn, as TAMS' key actor, remains hugely diffuse and invisible. I sometimes heard rumours of 'them' coming to Mahatsara but they never appeared. In fact, in the absence of a solid organisational structure with local presence, rumour was often the sole channel through which knowledge about TAMS travelled, knowledge that in most cases was proved wrong. Most importantly, of course, carbon remains unseen—no one can really say whether any carbon has been produced, nor, for that matter, what form it might take or what it might look like.

We have therefore seen how the extraction of carbon in these two forms was based on very different types of entanglements between people and things in Mahatsara, translating into highly diverse labour experiences. If the carbon-as-graphite entailed a stable and permanent workforce and a solid attachment to local landscapes and lives through extractive practices and infrastructures, carbon in TAMS remained socially detached through erratic work patterns and a mercurial range of actors. Carbon's very own intangibility and its inscription into new and obscure forms of exchange (like the vague 'temporary contract', for example), in turn, translated into feelings of deceit.

Interestingly, graphite is said to be the most stable form of carbon under standard conditions. The analogy between stable and unstable forms of carbon labour seems to fit well in this case. Through the concept of

volatility in its widest sense, then, I have tried to characterise feelings of temporariness, dislocation and intangibility in 'carbon labour' for TAMS, compared to those of permanence and groundedness in Izouard's mines.

Social dislocation and temporariness are, of course, not just present in carbon production in TAMS, but can also be observed in contemporary forms of resource extraction and global labour regimes in general.

In his analysis of past copper extraction in Zambia and current oil production in Angola, for example, Ferguson (2006) distinguishes between socially 'thick' and 'thin' projects. He argues that copper mining in Zambia during the 80s was based on the 'national development state model', and entailed the construction of vast 'company towns' for some 100,000 workers that incorporated social development projects like schooling, hospitals and even 'recreational amenities' like movie theatres (2006:197). By contrast, contemporary 'offshore' oil production in Angola, Ferguson claims, is much more 'clean' in the sense that neither production nor oil wealth partakes in the wider social context, making it 'socially thin' (2006:198). Similarly, Appel (2012) details the various ways in which detachment from the local place in oil extraction—what she terms 'modularity'—is brought into being through a series of 'socio-material practices' that make up the 'offshore' oil rig as a sort of placeless production process.

Although one could argue that issues of volatility in TAMS are just a reflection of contemporary forms of resource production and labour regimes—being equally present in conservation's industry in Andasibe, in the nearby mine of Ambatovy or in oil production in Angola—I think these examples show the importance of matter's 'affordances' or 'efficacies' and their role in specific assemblages. It is interesting to note, for example, Ferguson's claim that current non-petroleum forms of mineral extraction in Africa seek to attain 'oil-like features' of social disentanglement, largely facilitated 'by new sorts of spatial flexibility made possible by developments in communications, air transport, and so on' (Ferguson 2006:205). Similarly, where oil off-shore production is not geologically feasible, 'the strategic goal

seems to be to endeavor to make on-shore production as "off-shore-like" as possible' (2006:203), through, for example, the use of pipelines or 'gated' extraction sites. We can therefore here see how certain features of matter—oil's fluidity, for example—contribute to particular forms of extraction, at the same time as matter's entanglement with different socio-technical arrangements—like technological options in mineral extraction—bring resources into being in distinctly different forms. Thus, we can see that although the production of social distance and temporariness do follow a contemporary (neoliberal) trend, these are also partly afforded and conditioned by matter's specificities and its arrangement into particular assemblages: if this is achieved through the offshore rig in oil extraction, carbon contains the possibility of disentanglement in its own elusive (im)materiality.

I want to finish here by exploring the political implications of the different materialities of carbon in TAMS and in the graphite industry in Mahatsara. I do this by looking at a similar exercise carried out by Mitchell (2011), as he contrasts the different political possibilities afforded by carbon as part of the coal and oil industry over the last century.

Mitchell approaches the differences between oil and coal through a focus on the diverse ways of organising the 'flow and concentration of energy' and the 'connections and alliances' established for that aim (2011:8). Not far from Richardson and Weszkalnys' conceptualisation of resources as relational phenomena (2014:16), then, he examines the different political possibilities that carbon afforded in these two forms as it entered particular arrangements of 'people, finance, expertise and violence' (Mitchell 2011:8). Therefore, the rise of coal in the 19th century transformed into a political machine as its specific forms of extraction and production—where vast amounts of energy flowed through narrow channels—gave workers the 'ability to slow, disrupt or cut off its supply' (2011:19). Strikes, Mitchell argues, became effective 'because of the flows of carbon that connected chambers beneath the ground to every factory, office, home or means of

transportation that depended on steam or electric power' (2011:21), and provided a 'socio-technical agency' (2011:27) that fuelled the development of political claims to worker's rights and welfare. By contrast, this political force weakened with the conversion to an oil-based economy, partly because its extraction and transformation did not allow for the kind of energy concentration in strategic points that coal had previously enabled (except in Russia). Oil's material properties played an important role in this situation, requiring a smaller workforce for both extraction and transportation, since its liquid form allowed it to be channelled through underground pipelines that could escape sabotage. Indeed, Mitchel claims, 'oil pipelines were invented as a means of reducing the ability of humans to interrupt the flow of energy' (2011:38). Shipping, made possible by oil's 'fluidity and relative lightness' (2011:37), further eliminated the need for forms of labour that had previously been critical, as well as allowing the bypassing of labour and tax regulations. We can thus see how the materiality of carbon in these two different resources played a vital role in allowing or limiting the articulation of political claims.

In the same way, carbon, either as part of the graphite industry or as part of TAMS in Mahatsara, also led to different political possibilities. The examples of the incident with the missing pension money and with TAMS provoking feelings of 'deceit' are exemplary of such political implications: where the former was open to recourse by legal means, the other was elusive and unlocatable, and its unwelcome remnants and perceived injustice remain grounded in the local landscape. This, of course, does not mean that TAMS was impervious to local political claims. I was told by ANAE's Director Mino that during reforestation work, for example, as people's grudges increased due to a delay in payments, the work rhythms began to slow down and planting was done incorrectly in 'bad faith', in order to damage tree seedlings. Similarly, the one time a World Bank representative—or *mpamatsy vola*—made it to Andasibe, he encountered a threatening crowd, in Mino's words, of 'angry peasants carrying knifes'

(every male peasant carries a knife constantly, in any case) demanding their money. Either through 'silent resistance' (Scott 1985) or in very rare occasions, TAMS workers were able to assert a certain political agency. Compared to that afforded by the graphite industry, however, this agency was—like carbon itself—quite diffuse. The *mpamatsy vola* never returned to Andasibe; trees were kept rooted in the fields; and the contract, in a Kafkaesque way, remained in place, effecting its legal force from the distance even after the end of TAMS.

## Conclusion

In this chapter I have explored experiences of carbon labour through two specific resources—graphite and forest carbon—that have been extracted in the same landscapes and by the same people. By exploring the labour regimes, infrastructures and forms of exchange and value production that each form of carbon entailed, we have seen how carbon in TAMS was marked by experiences of volatility in its widest sense through notions of temporariness, social distance and intangibility/invisibility. A focus on resources as relational and dispersed phenomena has also revealed the ways in which the peculiar (im)materiality of carbon came to matter as part of the specific entanglements between people and things that were set up in Mahatsara in order to bring carbon into being.

We have therefore seen not just the difference that contemporary forms of carbon 'make' (Leach and Scoones 2015:2) to those involved in its production, but also the way carbon is differently made or 'done' (Mol 2002a), along with its political implications.

In this and the previous chapter I have focused on the concrete and socially entangled lives of carbon in the landscapes of Andasibe and Mahatsara, both as an implicit element in spatial and temporal oppression through the curtailment of movement by the 'environmental state', and as an explicit—yet elusive—natural resource as I explored experiences of carbon

labour. From this perspective we have seen that offsets, while based on carbon 'absences' (Bansal and Knox-Hayes 2013) or 'counterfactual material natures' (Bumpus 2011) have nonetheless very real and grounded effects in local labour and lives.

In the next chapter I move on to another social life of carbon, as I focus on efforts to attain its disentangled, commodity form, and on the experiences of complexity that result from these processes for TAMS' main actors.

# Part III: Introduction to Chapter Seven

On 18 January 2011, 475,000 EU carbon Emission Allowances (EUAs) were stolen from the Czech Republic's carbon registry. The theft was fast: around 11.00 am the registry building was evacuated after a bomb scare phone call, and, an hour later, 'the carbon credits had been sold to an account in the Estonian registry' (Lang n.d.). Although the theft was probably carried out within five minutes, no one noticed the missing credits until the following day. As a consequence, trading at the European Trading System was suspended and on 20 January the European Commission announced that in fact 'more than two million carbon credits' had been stolen in total 'from Austria, Greece, the Czech Republic, Poland and Estonia, worth a total of US$37.7 million' (Lang n.d.).

This incident, Lang argues, which was neither the first nor last in carbon credit fraud, 'provides a glimpse into the mess that is carbon trading in Europe', which features 27 different national registries. It also shows, I would argue, the idealised form that carbon credits (and other forms of commodified natures) are expected to take: a highly mobile, abstract and fungible object, that —in the space of five minutes—can be disconnected from its entanglements at a specific point in time and space, and re-entangled elsewhere with very little effort. Whereas this led to an unwanted outcome in the case of the stolen credits, it is this kind of spatial and temporal mobility that carbon needs to attain in order to be traded as a commodity in international markets. This malleability, in turn, which may evoke an appeal to simplicity or frictionless movement, can be, in fact, quite messy.

In the next chapter I follow carbon's complicated journey from tree to carbon credit, and the institutional experiences this process led to. As we will see, turning carbon into an economic object that could be owned and exchanged—that is, commodified—was not an easy task. In its effort to produce an object with clearly defined owners and to separate it from the

socio-material landscapes in which it was caught, we will see that TAMS runs into a series of very complex situations that were never resolved. 'The complicated project of Andasibe', as TAMS became known institutionally, thus offers a glimpse into the social life of carbon as (unfinished) commodity. Although the case of the Estonian stolen credits presented above posits these commodities as highly mobile objects, we will see that forest carbon projects pose specific challenges when it comes to turning carbon into commodity. Far from a one-way process, in fact, we will see there is a constant oscillation between the need to keep carbon grounded in specific contexts, and the need to disentangle it from those very same relationships, producing, at the same time, a lot of complexity.

# Chapter Seven: Dis/Entangling Molecules in the Complicated Project of Andasibe

***entangle*** *transitive verb* *in-ˈtaŋ-gəl, en-*\

*: to cause (something) to get caught in or twisted with something else*
*: to get (someone) involved in a confusing or difficult situation*

***disentangle*** *verb* \ˌ*dis-in-ˈtaŋ-gəl*\

*: to separate (things that are twisted together or caught on one another)*
*: to remove the twists or knots in (something)*

## Introduction

It has already been stated that TAMS' name shifted depending on the institutional context in which it was invoked. One of the various names it acquired was 'the complicated project of Andasibe'. The name apparently originated at the offices of CI Madagascar, but the first time I heard it was from ANAE[117]'s general director Minombolanoro Razakafoniaina, or Mino for short, during our first meeting in 2011, as she illustrated the many 'complexities' that TAMS presented as a project. Commenting on TAMS' many names, Rainer Dolch from Mitsinjo (one of the local organisations in Andasibe in charge of implementing the project on the ground), claimed that

[117] ANAE, was TAMS project manager since 2008.

'the extent of the name definitely reflects the degree of difficulty to implement the project, which is mainly due to its complexity and number of stakeholders involved' (Dolch et al. 2009:142–143). This idea of complexity, encompassing notions of confusion and complication, was in fact an ever-present feature in my conversations with TAMS' institutional actors, as well as in my own ethnographic experience with the project. But, what was so complex about TAMS? In this final chapter I aim to provide some answers to this question, as I focus on one last social life of carbon in TAMS: its (unfinished) commodity form.

Over the last four chapters I have presented the various ways in which multiple forms, or social lives, of carbon became entangled with the socio-material landscapes of Andasibe and Mahatsara. As a project ultimately concerned with the production of carbon credits, however, TAMS was essentially aimed at *disentangling* such processes and relationships, in its effort to produce a bounded, universal and timeless object—the Certified Emission Reduction (CER) or carbon credit—that could be clearly identified, managed and exchanged. In parallel to rooting trees to particular social and material contexts through reforestation, then, TAMS had to carry out a series of technical and legal practices to separate carbon from these same contexts, in order to convert it into credits and set them in circulation in the carbon market. A first and fundamental step in this process of turning grounded, material trees into mobile and abstract commodities (see chapter one) was establishing what carbon was and whom it belonged to. This, as we will see, was no easy task.

In the following sections I will follow the institutional experiences of TAMS as narrated by some of its key actors as they try to make sense of the project's complexity. By exploring one particular element that was central both to TAMS and to accounts of its many complications—carbon ownership—I will argue that a big part of TAMS' complexity derived from the type of commodities that carbon credits are and the way they are produced.

As Lohmann argues, all 'commodities-in-the-making are different' (2014:158), and respond to multiple and varied processes that aim to bring them about. Therefore, referring to a single theory of commodification, or an established set of elements in processes of nature commodification, may be more confusing than revealing. The commodification of trees as carbon sinks in TAMS, for example, did not *exactly* involve processes of appropriation or alienation (one of commodification's normative features as described by Bakker (2005), according to Lohmann [2014]) as we will see below. In order to explore the ways in which carbon credits came into being in the forest of Andasibe, I will focus on 'processes of economization' as described by Çaliskan and Callon (2009; 2010), rather than on commodification per se[118].

Economization in this sense refers to

> 'the processes that constitute the behaviours, organizations, institutions and, more generally, *the objects* in a particular society which are tentatively and often controversially qualified, by scholars and/or lay people, as 'economic' (Çaliskan and Callon 2009:370; emphasis added).

Callon's view is particularly set in the discipline of economics and its active role in processes of economization, what he terms 'performativity' (2007). From this perspective, economic models do not simply reflect an (economic) reality, but rather contribute to its making. This idea is elegantly captured in MacKenzie's (2006) characterisation of economic models as an 'engine', and 'not a camera' (for explorations of the performative role of economics as discipline see MacKenzie, Muniesa, and Siu 2007; Mitchell 2008).

118 An important element that I do not engage with is the methodology devised and used to measure and calculate carbon reductions—one of the most essential ways of bringing carbon into being. This is beyond the scope of my ethnography, and I direct the reader to Cecile Bidaud's (2012) fascinating work on this issue in Madagascar.

A broader understanding of 'economics at large'—similar to Foucault's notion of governmentality (Slater 2002:245)—as involving not only academia but also government, institutions and any other actors engaged in economic discourse and practice, provides a useful referent to assess the various processes that were set in motion in TAMS to turn land and trees in Andasibe into economic entities. This approach, therefore, focuses on processes of 'rendering economic' (Callon, Millo, and Muniesa 2007:3), or bringing into the market what was previously outside of it. The 'performance' of the economic object is not solely carried out by the discipline of economics, in this case, but also by all those actors involved in its becoming. Unlike theories of commodification, then, economization in this context directs us to the particular socio-technical practices that allow for objects to become commodifiable in the first place.

I will focus, specifically on Callon's notion of 'framing' (Callon 1998b)—a double movement of entanglement and disentanglement—through which objects and their owners can be defined, identified and separated from each other in order for trading to take place. Disentanglement may thus be seen as partly a process of 'objectification', as Çaliskan and Callon claim, in its most literal sense (2010:5): that of creating or producing the exchangeable object or commodity.

It is some of these processes that I bring into view in the next sections as I follow the complications that arose out of defining carbon and its property status, the problems associated with the clarification of land tenure in Andasibe and the government's entangling involvement with TAMS. Finally, I will argue that the socio-technical practices that were employed to bring about this abstract, mobile and exchangeable object—the carbon credit—resulted in a complicated tension between the need to entangle trees in particular contexts *in order to* disentangle carbon. The oscillation or wavering between entangled and disentangled carbon, we will see, embodies the 'signature tension' (Robertson 2000) of processes of

commodification in forest carbon projects, and makes them particularly complex.

In this final chapter, then, carbon appears as a complex and unfinished commodity, continuously—and necessarily—wavering between a grounded materiality and its abstraction into a bounded and mobile form. At the end of the chapter I briefly bring together the multiple social lives of carbon I have so far explored before moving to the conclusion in chapter eight.

I begin with a clarification on what I mean by, and how I deal with, complexity.

**A note on complexity**

During our first meeting in 2011 at ANAE's headquarters in the peaceful neighbourhood of Mausolée in Antananarivo, Mino shared her worries in relation to TAMS. Being the key mediator between the government and local communities, she was concerned about the long wait that farmers were experiencing due to the delay in government action, and the fact that although the ERPA (Emissions Reductions Purchasing Agreement[119]) had been signed in 2008, parts of the reforested areas had already been burnt, with unknown consequences for the validation process which had still not taken place. She was explicitly worried about the 'logistics' of the project, as she put it, in particular the 30-year period established in the contract with farmers which she considered one of the most challenging points, because how could farmers, she wondered, look after the forests for 30 years? What would happen if the money ran out, or if the person died? Who would get the payment then? The other 'big problem', she said, concerned land tenure clarification in Andasibe, a complicated situation due to various conflicting land statuses being in place. Carbon ownership, too, posed certain challenges in her view, since there was no

119 Further explored below, the ERPA is the carbon sale contract between the World Bank's BioCF and the Malagasy government.

international law to guide the issue of property in terms of carbon—yet trade was already taking place. The risks associated with these types of projects and their complexity, which translated into long bureaucratic processes, she argued, were the reasons why forestry carbon prices were so low in comparison to other types of projects.

This notion of complexity in carbon projects was, however, not only shared by middle-level actors such as ANAE or CI Madagascar. The BioCarbon Fund's executive summary in the booklet 'BioCarbon Fund Experience: Insights from Afforestation and Reforestation Clean Development Mechanism Projects' (2012), which includes TAMS as a case study[120], concludes with a series of recommendations drawn from lessons learned. These are:

- Ensure *simple and clear procedures* and predictable timelines to achieve credit certification.
- Define *a simple approach* to non-permanence that ensures the fungibility of LULUCF credits with other credits in the market.
- *Simplify* additionality demonstration and baseline determination as much as possible.
- Develop *easy-to-follow* rules for ex-ante estimation of GHG accounting and allow for progressive adoption of detailed methodologies.
- Develop *easy to follow* monitoring methodologies.
- Avoid restricting the type of people that must be involved in small-scale projects and carefully decide the cap in emission reductions imposed on this type of project.

120 TAMS appears here as the Vohidrazana-Mantadia Corridor Restoration and Conservation Carbon project.

(BioCarbon Fund 2012:14; emphasis added)

From the recommendations, and all throughout the document, we find a strong recurring issue: that of complexity that needs to be simplified. Indeed, as explained to me by André Aquino, from the BioCarbon Fund and responsible for the operation of TAMS in Madagascar, forest or land carbon projects are particularly 'complex', especially those that hope to achieve CDM validation.

> 'The CDM process and land is much more complex. You do a windfarm, it's complex from the point of view of financial arrangements but, technologically, it's very simple, we know how to do a wind turbine. Land we don't know … we don't know how to plant palissandre [rosewood] and a hundred other species, we know more or less … ownership of land is complex, land is an emotional thing, people depend on land for many other different things, so I think the complexity of land-based emissions is more manifold than any other technology'.

Methodological issues, strict CDM regulations and validation processes, ownership, land tenure, lack of legal frameworks or challenging temporalities: we have here particular examples of the issues that were seen to complicate TAMS and forest carbon projects in general. Although complexity appears unanimously, the forms it takes, however, vary greatly, depending on each actor and the scale at which they operate. This, of course, could not be otherwise. This makes the writing of the chapter difficult because although I cannot assume that complexity meant the same for ANAE as it did for the BioCF, neither can I approach each actors' own feeling of complexity, because it would be lengthy, unpractical and, well, too complex. In this sense, I follow the common practice in anthropology of trying to make complexity visible while simplifying it enough so as to make it

comprehensible (Strathern 1991). Rather than trying to summarise the multiple and diverse experiences of complexity in TAMS in a unified account (Mol 2002a:2), I have chosen to concentrate on one instance of it: carbon ownership. This is interesting, I think, because on the one hand it is one of the most fundamental elements in the production of carbon credits (as we will see below), and, at the same time, it was one of the most recurrent themes in accounts of the project's complexity by most institutional actors.

It is important to point out, as well, that complexity in this chapter does not appear in the sense in which it does in most of the anthropological literature: instead of an analytical category that helps me explain ethnographic phenomena (i.e. Law and Mol 2002a), I approach it as the subject of analysis—as a matter of concern for informants (Riles 2000:xiv). This is not, therefore, a case in which I 'denounce' (Law and Mol 2002b:4) the many simplifications that TAMS enacted as it tried to deal with a complex world[121], (I could not do justice to Lohmann's work on this subject, for example 2006; 2009; 2014). I rather seek to understand what complexity—as an experience of TAMS as forest carbon project—was all about. Instead of using complexity to understand carbon trading (as Powells 2009 does, for example), I explore the processes set in motion to produce carbon credits in order to explain complexity in TAMS.

Also, multiple meanings of entanglement and disentanglement will be seen to crosscut and overlap along the chapter. Sometimes I employ the terms as analytical categories in Callon's sense (Callon 1998c), which, as we will see below, aim to explain the processes of turning certain things into economic objects. At other times, they appear as complications and simplifications found in TAMS. Also, although complexity, complication and confusion are not necessarily the same thing[122], I treat them as variants of the same element here when I refer to experiences and explanations of

121 Mol (2002b) has brought attention to the anthropological tendency to valorise complexity and negate attention to simplification as a positive virtue.

122 Latour, for example, has stated that complication and complexity are, in fact, opposites (1996:219).

TAMS because it is thus, interchangeably, that informants used them. Finally, this chapter is in turn one more instance of the tension between entanglement and disentanglement, as in my aim to 'work out or unravel' (one more meaning of disentangle) complexity in TAMS, I have to perform one more 'twist' between its elements.

From here, a further problem arises. How does one represent complexity and confusion but through another version of disentanglement? In this chapter I 'lay out' complexity through 'a series of linear stories' (Mol 2002b:249) where these must be seen as, unavoidably, inaccurate and incomplete. Although I engage with people's narrations of the difficulties and problems that TAMS ran into, I cannot claim in any sense that these are either accurate or true. Often, depictions of TAMS contradicted each other, which was of course part of all the confusion that surrounded the project. This also makes the structure of the chapter messy, complicated and partial. In my own search for simplicity—the linear and coherent chapter—I cannot but perform one more instance of TAMS' complexity.

Interestingly, what all of the accounts by TAMS actors presented above have in common is not just the recurrent issue of complexity, but also that which they leave out: the carbon credit itself. Complexities appear as obstacles to the achievement/becoming of the carbon credit, an element that is however presupposed and left unquestioned. The idea that credits could and might be generated, in fact, was always expressed as a future 'taming' of these complexities, that is, when complexities as obstacles were overcome: 'when we clarify land tenure', 'when we establish the Implementation Agreement', 'when the current context [transitional regime] is resolved', 'when the project goes through the voluntary market, with simpler standards and regulations'. Below, however, we will see how complexities in TAMS were not mere obstacles to the achievement of the 'carbon credit', but messy complications that emanated from it. I begin in the next section by exploring the definition of carbon and its property status in TAMS as a necessary first step in its disentanglement.

**Defining Carbon, Establishing Ownership**

> *'The issue of ownership is also part of the essential safeguards required by investors or buyers of carbon credits. Indeed, which bank, investment fund, or offsetter would take the risk of funding a structure that may not be able to guarantee the return of the loan, the payment of dividends, the delivery of carbon credits in a timely manner due to a dispute over property? This is why, before any contract negotiation involving carbon credits is undertaken, the project developers must clarify the question of carbon credit ownership'.*
>
> (Chenost et al. 2010:123; personal translation)

As Slater has stated, and as the quote above from the booklet *Les marchés de carbone forestier/Bringing forest carbon projects to the market* makes explicit, property and ownership are one of the 'most fundamental' forms of framing or disentanglement (Slater 2002:241). Evidence of ownership achieved through legal instruments is in fact a 'universal requirement of all tradable permit systems' (Lohmann 2006:73), because without a clear notion of what is to be traded and who the buyer and sellers are, economic transactions cannot take place. This operation therefore involves 'the establishment of specific technical, material, textual and legal devices which allow an owner(s) to be identified, which define the nature of the rights attached, and which dictate the terms of their enforcement' (Çaliskan and Callon 2010:12).

Carbon credits are an ambiguous commodity, and no binding agreement exists as to what sort of products they are. While the literature has often characterised them as commodities (for example, Bumpus and Liverman 2008:128), they have also been explored as currency (Button 2008) or as a form of rent (Felli 2014). While Lohmann states that they

constitute property rights to the atmosphere because they set exclusive rights to a global carbon 'dump' (2005; 2006), the term 'property rights' has been deliberately avoided by the Kyoto Protocol in the claim that they are temporal (credits should, in theory, be reduced over time), in favour of 'allowances' or 'permits'. Credits produced in the CDM, it has to be remembered, are in turn of a particular type, being offsets or Certified Emissions Reductions (CERs). The BioCarbon Fund terms emissions reductions as 'assets', arising out of:

> - Having the project registered by the CDM Executive Board.
> - Having the emissions reductions verified and certified by a third party.
> - Having the Emissions Reductions issued by the CDM Executive Board.
>
> (BioCarbon Fund 2005:2)

We can begin to see how the production of CERs does not just arise from activities carried out on the ground, or the actual carbon stored in trees, but also necessitates key accounting, certification and verification practices in order to come into being. These practices, in turn, cannot take place without clear property rights to the 'asset' in question, but the ambiguous character of the asset already opens up a space where definitions and categorisations become a key site for particular 'performances' of the carbon credit.

In an illuminating way, a brochure commissioned by Conservation International to a legal expert, David Takacs, entitled *Forest carbon: Law and Property Rights* states that 'as a new form of property, forest carbon presents legal complications that no jurisdiction has completely untangled' (2009:5). We have here our first case of 'complexity'.

Although carbon transactions in CDM projects are established through the Emissions Reductions Purchasing Agreement, ERPA, where seller and

buyer specify the terms of the carbon sale, the juridical nature of carbon credits is not contained within international law, and the Kyoto Protocol does not provide any indications as to how these should be treated. Carbon credits are therefore 'sui generis instruments' (Chenost et al. 2010:124), created either by instruments of international law or by private voluntary initiatives (in the case of the Voluntary Market). Thus, each case is referred to national law, where it has to be determined, usually through legal experts, the type of assets that carbon credits constitute and their ownership status. If no national framework exists regulating carbon credits—and this is the case in most countries—then their definition is usually established by 'reasoning by analogy' (Chenost et al. 2010:125). This can lead to different situations, depending on each country's legal system: carbon storage can be seen as a natural, biological process and thus deemed a natural resource subject to public or state appropriation, or, as in Madagascar, it may be equated with a 'fruit' from a tree (which, in turn, can be the result of a natural process or an 'industrial' one, as I explain below), and thus become subject to private property. But this process is far from straightforward because carbon as property or thing owned can take various forms, 'adding another level of complexity' (Takacs 2009:13). Thus, Takacs (2009) argues, carbon can transform into five different types of property objects—where some of them can be broken down into smaller parts with potentially different ownership status. For the sake of clarity, and without going into too much detail, I present these as a list, with some of the 'complexities' Takacs identifies (2009:13–16) in brackets. Carbon, thus, can be owned as:

- *Sequestered carbon* as 'the stored commodity' (is carbon separable from the tree and can it have a different owner?).
- *Carbon sinks* as 'the natural entities that retain carbon' (is carbon stored in trees, above land, below land, roots or branches?).

- *Carbon sequestration potential* (who has the rights to manage and control the land that has carbon potential?).
- *Carbon credits*, or the actual 'asset' that can be sold in the market, allowing 'its bearer to pollute an amount equivalent to the carbon sequestered' (are they separable from sequestered carbon, carbon sinks or sequestration potential?).
- *Usufruct rights*, which 'comprise the range of legal rights and agreements whereby an entity may use and derive benefit from property that belongs to another entity, provided the property is not impaired' (can previous usufruct rights holders impede the granting of new usufruct rights to carbon actors?).

Here we already see that one of the first steps in carbon disentanglement involves establishing the definition of what is to be traded in order to set 'clear' property rights, but this move is fraught with complications, because of carbon's multiple entanglements with trees, land and people. Carbon ownership in this sense appears as a bundle of rights (Hann 1998:1; Maine 1905), but these rights can be ascribed to different aspects of the 'object' which do not necessarily add up, since they operate at different scales. The 'performative' character of definitions is clearly evidenced here: it is the definition of the 'thing' and its classification in legal terms that brings it into being, and, depending on which definition is adopted, diverse objects and owners emerge.

The key device employed to define carbon and establish its ownership status in TAMS was a study commissioned by the Ministry of Environment, Water and Forests in 2006 to a Belgian and a Malagasy lawyer, Matthieu Wemaëre and Guy Rajaonson, entitled '*Note sur la nature juridique du*

*carbone et les droits de propriété sur les crédits carbone. Proposition pour la rédaction d'un Protocole d'Accord'* (Note on the legal nature of carbon and property rights of carbon credits. Proposal to draft an Implementation Agreement). The report, a document that has not been widely circulated and that also went by the informal name of 'the carbon property report', looks like an attempt by the Government of Madagascar (GoM) to establish their rights to carbon ownership as sole carbon 'seller' in the transaction with the BioCF. As André Aquino from the BioCF in Madagascar explained, the government's involvement in TAMS as carbon owner was not a pre-given thing, but rather something that emerged out of their involvement with the project. This was institutionally accepted on the condition that an 'Implementation Agreement' or *Protocole d'Accord* was established between the Ministry and participating communities where the terms of benefit sharing were specified (something that, in any case, never happened).

Interestingly, the idea of 'separation' is recurrent in the Wemaëre and Rajaonson report, as the legal definition of carbon becomes problematic due to its ambiguous materiality. Carbon, the document argues, is not defined by Malagasy law, and the state holds no exclusive rights over it. It must therefore be brought into an existing legal status by comparison, and the authors deem it most appropriate to establish sequestered carbon as an incorporeal 'industrial fruit[123]': an object that results from human intervention or activity but where no alteration of substance takes place (similar to a harvest) and which, in this case, has no 'perceivable or material reality'. This materiality complicates things for carbon's categorisation as either movable or immovable property: on the one hand, carbon cannot be transported from one place to another, but it can be released to the atmosphere if the tree that contains it is cut. On the other, it may be argued that carbon is 'inseparable', *indissociable*, from the tree, a movable object that nonetheless becomes immovable by virtue of belonging to a CDM

123 The notion of industrial fruit comes from the Malagasy civil code.

project, since trees are to remain intact for as long as the project lasts (usually 30 years). Carbon's treatment as both immovable and intangible runs into a juridical contradiction, however, because an incorporeal object is 'necessarily detachable from any material support', whereas an immovable one is not. From what the report terms a 'pragmatic' perspective, classifying it as immovable would also 'favour landowners' in terms of property rights. The report, therefore, resolves to treat sequestered carbon as a 'movable incorporeal good', or *bien meuble incorporel* (as a specific category of the more general 'industrial fruit').

Who do sequestered carbon and carbon credits belong to then? Another tension arises here between credits as part of the CDM process, and carbon as part of trees within the Malagasy legal system. On the one hand, as part of a CDM project, carbon credits are registered and issued to the 'project participant' established in the Project Design Document, or PDD, which in TAMS' case was the Ministry of Environment and Forests (MEF). But on the other, the Ministry cannot claim ownership over the fruits of private plantations, or over those where people enjoy 'real rights'. In fact, according to the Malagasy civil code, and as stated in the Wemaëre and Rajaonson report (2006), 'ownership of a thing, whether movable or immovable, gives rights to everything it produces and that is attached to it, whether naturally or artificially'. This would make carbon an 'artificial accessory' of the tree plantation (because its attachment results from human intervention through reforestation) and thus the property of landowners.

We can begin to see here some of the tensions that arose out of efforts to define carbon and establish its property status in TAMS, as a first step in bringing credits into being. In the next section I explore these processes through the lens of entanglement and disentanglement as defined by Callon (1998c; 1998b).

*Dis/Entangling carbon*

In *Entangled Objects* Nicholas Thomas offers a view of the gift/commodity binary as malleable and contextually changing, highlighting the 'mutability of material objects' (1991:88). Objects, he claims, can shift back and forth from gift to commodity status through context and narrative. In Thomas' view, the gift is characterised by being entangled with its history and that of its producer as it is put into circulation, whereas for a commodity, those relations are erased—or 'uninteresting' or 'inconsequential' (Thomas 1991:103)—so that it can be alienated and 'newly appropriated' (Çaliskan and Callon 2009:387). His argument on entanglement is also scaled up to account for the mutual, historical entanglements of colonial encounters.

This notion of entanglement and disentanglement has been taken up by Callon to explain, in the field of economic sociology, what he terms 'processes of framing' (1998c). Understanding markets as 'organized collective devices' engaged in practices of calculation (Callon and Muniesa 2003), 'framing', he argues, serves to demarcate, in any given economic transaction, those relations that will be taken into account and those which will be left out by the 'agents' involved. Without a 'clear and precise boundary' (1998c:16) which determines the agents and objects that form part of a given market transaction, calculation—as the key constitutive practice of a market—cannot take place.

This is where Thomas' notion of entanglement and disentanglement comes in particularly usefully for Callon. As he claims, entanglement/disentanglement is a double movement whereby (temporary) relationships are established between market actors that allow for economic exchange. At the end of this entanglement (always unstable and ever-changing) agents are 'quits' and can be disentangled once again. On the other hand, this exchange can only take place through a clear demarcation of those who are carrying out the transaction and of the things being transacted:

> 'To construct a market transaction, that is to say, to transform something into a commodity, and two agents into a seller and a consumer, it is necessary to cut the ties between the thing and the other objects or human beings one by one. It must be decontextualized, dissociated and detached … If the thing remains entangled, the one who receives it is never quit and cannot escape from the web of relations. The framing is never over. The debt cannot be settled' (Callon 1998c:19).

The double movement is of particular importance here as it refers, on the one hand, to the proliferation of relations that are brought together as a result of market transactions, and, on the other, to all the processes that a 'thing' must undergo in order to become transactable as it is disconnected from one context and moves to another[124].

The transformation of an entangled object into one devoid of such attachments and thus amenable to circulation can be observed, for example, in the case presented by Waldby and Mitchell (2006) in relation to the production of embryonic stem cell lines for biomedical purposes. In this case, embryos donated by couples who have undergone fertility treatments can be donated and disaggregated into stem cell lines for therapeutic research. This stem cell line can then be 'banked, copied and circulated, and constituted as the intellectual property of the researcher' (2006:69). Embryos are, however, deeply entangled in webs of kinship and affect, as they are the result of a long process involving tensions between loss and hope, as couples move from situations of infertility to IVF treatment. For the embryo to become a stem cell line, however, it has to be disentangled from this network of social relations if it is to enter those of the laboratory.

124 As Appadurai (1986) has argued, on the other hand, certain objects need to remain attached to past histories in order to acquire value as exchangeable objects, such as heirlooms or antiques. As we will see below, in fact, this is also a necessary and fundamental condition of carbon credits.

Waldby and Mitchell identify two key mechanisms that bring about disentanglement: informed consent and intellectual property rights. These elements work to dissociate the embryo from 'the network of family relations that produced it' (2006:73) as they establish legal claims to the tissues in question. If informed consent transforms a gift into a commodity by making the donor forfeit any legal claim to the tissue in the future, the patenting of the stem cell line establishes intellectual property rights deriving from the 'inventive step' (2006:73) undertaken in the laboratory, which primes this form of labour and disconnects it from previous ones, such as the production of the embryo by the donor in the first place.

In this case, informed consent and intellectual property rights may be seen as what Slater (2002) terms a 'separative technology' in processes of framing, which works to achieve 'individual objects that can be materially and conceptually disentangled from their context as discrete and transactable things' (2002:238), and circulated as property. Separative technologies in this sense also work to disentangle and specify the 'socio-legal' entities taking part in the transaction, and the scope of the transaction itself.

We have already seen part of this process of 'framing' above where the Wemaëre and Rajaonson report (2006) emerged as a way of identifying and disentangling an element of Andasibe's landscape—carbon credits/CERs (certified emissions reductions)—from the trees and land to which they were originally attached. In the absence of a legal framework, carbon had to be brought into—or entangled with—the existing Malagasy legal system as a 'movable, incorporeal good' in order to become an object of property, a move that was in itself complicated due to the ambiguous materiality of carbon. As a device that aimed to define carbon credits within Malagasy law and specify the various entities that could claim rights to them, the Wemaëre and Rajaonson report (2006) can be seen as a key 'separative technology' (Slater 2002) in TAMS.

But through the report an important problem emerged (at least for the GoM), in that carbon could not be considered an object owned by the government a priori (as the ERPA or the CDM process for registering credits presupposed) because carbon was now an 'accessory' of the tree plantation, and therefore subject to land ownership. The solution adopted by TAMS (and suggested by the report) in order to turn the GoM into the sole carbon owner was to establish the Implementation Agreement with landowners in order for the latter to relinquish their carbon property rights in exchange for 'benefits'[125]. This, of course, meant identifying who the landowners were.

Paradoxically, as a 'disentangling' device that established carbon as a 'movable, incorporeal good' so that it could be owned, the Wemaëre and Rajaonson (2006) report drove TAMS into one of the most 'complex' areas the project had to deal with: land tenure. As the vice-Mayor of Andasibe confided in one of our meetings regarding TAMS, 'as soon as one began looking into land property, all the problems came out'. The initial efforts to disentangle carbon led the project to a sticky entanglement with the socio-material landscapes of Andasibe, where the 'web of relations' (Callon 1998c:8) in which carbon was caught through trees became a major obstacle for TAMS, as I detail in the next section.

*Disentangling land ownership in Andasibe*

From its early conception, land tenure securitisation was a key priority for TAMS. This came partly as a result of very early project consultations with local communities—initiated by Holloway as she designed the

125 We saw in chapter six how, in the absence of the Implementation Agreement, temporary contracts were signed between farmers, ANAE, the Regional forestry Service and CIREF under BioCF directives, where farmers committed to leaving the land intact for 30 years in exchange for some future and undefined benefits. The temporary contracts established in anticipation of the Implementation Agreement, and the Agreement itself, can be seen as further and essential 'separative technologies' in that they effectively constituted a transfer of property from landowners to the GoM, turning the former into 'beneficiaries' instead of carbon owners.

project—who claimed that one of their requirements was secure land tenure. On the other hand, clear land tenure was, as it has been explained above, pivotal in establishing carbon property rights and thus in the disentanglement of carbon from its local context.

Clarification of land tenure in Andasibe was consistently seen as one of the most 'complex' issues by most actors in TAMS. Indeed, land tenure in Madagascar, and more generally in Africa, is usually characterised by the complexity deriving from 'pluralistic systems' (Evers, Spierenburg, and Wels 2005:3), where state, private and customary systems compete and overlap. Broadly conceived, this plurality refers to two main forms of social organisation and the normative orders that accompany them and grant them legitimacy. We therefore find, on the one hand, 'direct users' or local communities who attend to land through customary forms of organisation and understandings, and, on the other, the varied 'formal economic agents' (Muttenzer 2006:269) such as territorial administrations, aid donors, conservation organisation and international banks, who act within the framework of state sanctioned environmental law. Formal law reproduces the French '*système domanial*', or land legislation, and only recognises state and private forms of ownership, implemented through a system of land titling that was established in the colonial era. Obtaining titles has always been a slow and costly process and is rarely employed by rural people, with only 10% of agricultural land being titled (Muttenzer 2010). Customary land tenure, on the other hand, is characterised by the 'fuzziness' (Verdery 1999) of local, contextual rules of access and use (see, for example, McConnell 2002).

Historically, there have been various attempts in Madagascar to bring in customary forms of tenure into the formal system in order to grant state 'legibility' (Scott 1998) to an area always considered inefficient. After independence, various 'cadastral operations' or collective registrations took place whereby communities obtained collective titles to the areas they worked and occupied. Towards the end of the 1980s, with the beginning of

international environmental action in the country, and in response to dictates from the IMF and the WB, the National Environmental Action Plan (NEAP) was drafted and included the replacement 'of the community-based tenure system with a formal land tenure system under which all land would be titled in the name of individuals' (USAID 2010:3). The program was not fruitful and was 'suspended due to costs and the difficulty of reconciling incompatible formal and customary tenure systems' (USAID 2010:3). Being therefore essentially incommensurate, attempts have been made in the last decade to implement a third type of normative order that would bridge between the formal and customary systems. In 2004, the Land Reform Programme, or *Programme National Foncier* (PNF), introduced, among other things, a new land property status, that of 'non-titled private property'. The idea was for a cheaper, faster and decentralised system to deliver 'land certificates', or *certificats fonciers*, to the majority of rural Malagasy who occupied land but had no title to it. Both individuals and groups asserting rights to untitled land could request these certificates that had then to be approved by a 'local commission' composed of Municipal authorities, elders and neighbours' (Collectif pour la Défense des Terres Malgaches - TANY 2015:1).

TAMS was therefore initially confronted with three forms of land tenure for the plots it had reforested.

First, there was the case of state land, where parcels were 'managed' by private or (semi) public organisms such as Mitisnjo or the Andasibe Mantadia National Park (AMPNP) respectively. Although this should have been the most straightforward case, in that land belonged unequivocally to the state, it posed a particular, unexpected challenge: in the area of Vohimana, where reforestation plots were managed by the organization Man and the Environment (MATE), land turned out to belong to a now extinct administrative entity, the ex-province of Toamasina. With the beginning of the de-centralisation process during the late 80s, this bit of land had been absorbed by the newly established region of Moramanga, wherein

someone from a committee had, in turn, sold part of the land to an individual. Since no laws had yet been established dictating whether ex-provincial land should go to municipalities (i.e. Andasibe) or the regions (i.e. Moramanga), the owner of this piece of land—and therefore its trees and carbon—remained unknown (and, to an extent, unknowable).

Then there was the case of 'private, titled property'. Similar to state land in that the owner was clearly identifiable, this land status would have been easy to deal with if it hadn't been for the fact that the actual people who offered land under this category to TAMS were not the title holders, but farmers who had worked the land for over 20 years and had thus been classified as 'occupants'. At some point, those members of colonial families that were still present in the area or could be reached (Louys and Izouard) came to an agreement whereby they would retain land ownership but would cede carbon rights to those classified as occupants. This, however, was something that, in Mino's words, the 'carbon buyer did not accept' because of the way carbon ownership had been defined by the World Bank's lawyers (this is most probably a reference to the Wemaëre and Rajaonson (2006) report). Being unacceptable from a legal perspective, this situation, too, was never resolved.

Finally, and the most poignant of all cases because of the great resources it drew on and brought into Andasibe, was the case of customary land, now turned into 'non-titled private property' through the Land Reform Programme (PNF). It was indeed through TAMS that funding from the National Environmental Action Plan III (EP3) was obtained to establish a local land registry office, or *Guichet Foncier*, in both Andasibe and the regional capital, Moramanga, as a pilot for the national initiative. The establishment of the office also included the implementation of 'PLOF' (*Plan Local d'Occupation Foncière*) a GPS-based programme of national reach that aimed to classify all land use in the commune and digitalise it into colour-coded maps. Based in the town hall of Andasibe, Rija, a local young man, explained to us the intricacies of the programme, and showed us some of the

'unfinished' maps—material evidence of the complexities found on the ground. Although obtaining a land certificate from the *Guichet Foncier* should have been a fast and inexpensive process for individual farmers, it transpired that part of the land classified as 'non titled private property' had already been titled as 'collective land' through the previous cadastral operation of the 80s and was thus incompatible with the new Land Reform certificates. The same parcels of land, therefore, were subject to mutually exclusive legislation, one past, the other present.

There was a further and surprising impediment, however, to the granting of land certificates: not only were they in conflict with earlier normative orders, but they also clashed with TAMS' projected future. As it turned out, the land certificates risked TAMS itself by granting its holders full rights of ownership and use over their parcels and the trees contained in them. As I learnt from an anonymous informant, Conservation International (CI) had reservations in granting full property rights to the areas because of a similar, negative experience in the nearby conservation area of Torotorofotsy, where certificates had been issued and then taken back due to 'inappropriate' land use[126]. Since 'land certificates' granted full ownership over land *and* trees, there was the risk that owners might decide to clear TAMS trees legally. Certificates then posed a potential risk for TAMS, and the cost of having to take them back in terms of farmers' loss of trust in organisations was seen to be too high. It is in fact quite ironic that although the BioCF quoted the establishment of the land registry office as one of TAMS' successes, none of the certificates delivered were to farmers involved with the project.

We can see how the tension between dis/entanglement continued in the processes aimed at clarifying land ownership in order to establish clear property rights to carbon. As the project to 'bring back the forest'[127], TAMS

126 One of the main differences between land certificates and land titles is that the former can be withdrawn by the authorities after having been granted.

127 Or, as we saw in chapter 3, 'to restore the fallows'.

reforested a number of hectares in Andasibe, rooting trees to particular socio-material contexts. But the 'fuzziness' (Verdery 1999) of these contexts was an impediment to TAMS as carbon project, where a clear object with specific owners had to be identified. Extinct administrative territories, absent colonial families, earlier legal regimes: land and trees remained entangled in a mash of past relationships that greatly complicated the separation of carbon from them. In a sense, this is similar to the case described by Verdery (1996) during land-reform processes in post-socialist Transylvania, where land seemed to acquire 'elastic' qualities as it stretched or shrank during de-collectivization. Instead of a spatial elasticity, however, we find here a temporal one, where trees suddenly seemed to be pulled back to a messy past that refused to let them go. The tensions between dis/entanglement gained a further twist, however, with the case of 'non-titled, private property'. Here, the very 'separative technology' (Slater 2002)—the land certificate—that was needed to bring carbon into being risked re-entangling trees with a landscape that endangered the future of carbon itself.

Before I move on to explore another fundamental aspect in TAMS' complexity as identified by its key actors (the Government's involvement with the project), I want to consider here the role that documents play in processes of carbon disentanglement.

*Documenting carbon*

As Çaliskan and Callon remind us, and as recent examples in the anthropology of finance demonstrate (see Miyazaki 2005; Zaloom 2006), the 'material infrastructure' of the market plays a 'decisive role' in market formation (2009:384). In processes of economization, that is, materialities matter.

In the previous chapter I explored the materiality of carbon as natural resource as the result of the relations and practices that brought people and things together in processes of extraction, rather than simply as CO2. In a

similar way, then, we can see that the materiality of carbon as commodity in this case appears through a set of relations between human and non-human actors that aim to render carbon 'economic': fungible, mobile and therefore exchangeable. Within these networks, a particular form of 'infrastructure' stands out: documents.

As a project ultimately engaged with an 'immaterial' element—the Certified Emissions Reduction, or CER—TAMS depended on a series of documents that were indispensable and instrumental to carbon credits' materialisation. We observe here the 'paradox' that Miller claims exists in projects devoted to immateriality, such as religion, philosophy and finance: that 'the more humanity reaches towards the conceptualization of the immaterial, the more important the specific form of its materialization' (Miller 2005:28). CERs, indeed, can only take form through material means, and these are in essence the array of documents that were to establish, define, calculate and verify carbon reductions, including those documents that would have brought carbon into being as an ownable and transactable object. From this perspective, then, documents in TAMS can be seen as 'market devices' (Callon, Millo, and Muniesa 2007) in that they have the capacity to 'render economic': they are not simply representations of the things they contain, but also help bring them about[128].

Already introduced in previous chapters, one of these key documents was the Project Design Document, or PDD. The role of the PDD was mainly that of providing a detailed account of the project, presented as a feasible activity which furthered the two main objectives of reforestation projects under CDM: emissions reductions and sustainable development. The PDD had to demonstrate that TAMS fulfilled CDM reforestation project requisites and followed carbon accounting methodologies[129]. Its role cannot be

128 As explored in chapter six, the capacity or effectivity of documents must be seen as a distributed and relational effect, rather than as an inherent property of documents.

129 More specifically, the PDD had to prove that TAMS complied with the following: land eligibility (that land had remained deforested from 1990 until the project start date); a demonstration of project boundaries through GPS coordinates; clear legal title to land,

underestimated: it was through this document that carbon credits were discursively produced and mathematically calculated, offering a narrative and an application of CDM methodology which would have served as a basis on which to assess, and eventually grant, project validation—the final step in credit generation. But the PDD was in itself dependent on a series of further documents as devices which were key to carbon disentanglement because they rendered carbon both visible and ownable.

While the PDD and the ERPA were central in constituting the CDM project and the carbon transaction respectively, the Wemaëre and Rajaonson report was pivotal in objectifying carbon: establishing what carbon was and who might have rights to it. Once carbon was 'known' to be a 'moveable, incorporeal good' that belonged to the landowner, the question of land tenure opened up. Land titles played a decisive role in establishing certain property statuses, although, as we have seen, these were far from clear and remained unsolved. We saw how the case of 'non-titled, private property' brought to Andasibe a series of additional technologies, peoples and materials—the Land Reform Programme, the land registry office, the 'PLof' with its GPS technology and the certificates themselves—in the effort to identify and establish clear land-owners in these fuzzy situations. As 'market devices', then, documents in TAMS served the task of 'abstracting' carbon (see also Richardson and Weszkalnys 2014:14) in more than one way: not only did they represent carbon as a particular object or form of property, but they also worked to 'transform' and 'displace' (Callon, Millo, and Muniesa 2007:4) 'it' from its entanglements with trees, land and people by 'separating' and rendering it knowable, fungible and exchangeable.

Over the last sections I have presented a series of attempts at disentangling carbon from the socio-material landscapes that TAMS had reforested, in order to produce a bounded and visible object that could be

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forest rights and rights to carbon credits; carbon measurements carried out through approved methodologies based on baselines; and the conditions of additionality, permanence and leakage measures.

owned and, consequently, exchanged. We have seen how this was not a straightforward process, but rather one fraught with complications and complexities, where the very 'separative technologies' (Slater 2002) employed to disentangle carbon led, in parallel, to further entanglements in the project.

But the trees that TAMS planted were not simply rooted to the *savoka* fields in Andasibe, with all the 'fuzziness' (Verdery 1999) that that implied. As a 'pilot' forest carbon project of national and international scope, TAMS trees also flourished in Governmental offices and funding budgets, its seeds sparking the imagination of staff.

In the next section I present one more instance of the tensions and entanglements that came about as a result of rendering carbon economic, as I explore the specific problems that resulted from the government's involvement with the project and its claim over carbon ownership.

**A dis/entangling government—one more complication**

In a consultancy report for CI from 2007, Holloway speculates that the transfer of carbon rights 'to a single entity'—the Government of Madagascar—may have been done in order to simplify the carbon transaction. This might have made sense in that the Emissions Reductions Purchasing Agreement, would have been signed between two entities, the BioCF and the GoM, instead of with each landowner. Whether this was CI's or the BioCF's intention—or a demand from the government—we do not know. What we do know is that this move to further disentangle carbon ownership did not make things 'simpler'. As land proved particularly 'elastic' (Verdery 1996) in the forests of Andasibe, so did the GoM appear to stretch, or rather multiply, in its involvement with TAMS, leading to very messy entanglements, as I will now show.

CDM projects engage with individual countries through a Designated National Authority, DNA, which is usually—but not necessarily—a government agency. The DNA plays a pivotal role in the development of the project, first by authorising it through a 'letter of no objection', and by confirming in a 'letter of approval' that (undefined [130]) sustainable development criteria are met in the project, 'that the country has ratified the Kyoto Protocol, and that participation in CDM is voluntary' (UNFCCC-CDM n.d.). Additional tasks also involve the 'submission of standardized baselines' for the project, which is the framework for calculating the number of emissions reductions produced. These steps are therefore necessary for the PDD to come into being and be validated and registered, and through these documents (which may be seen as one more instance of 'separative technologies') the DNA acquires a central role in the successful production of carbon credits.

130 'The UNFCCC does not provide a definition of sustainable development in the context of the CDM. Sustainable development is defined in general terms as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"' (Brundtland, 1987 in BioCarbon Fund 2012:120).

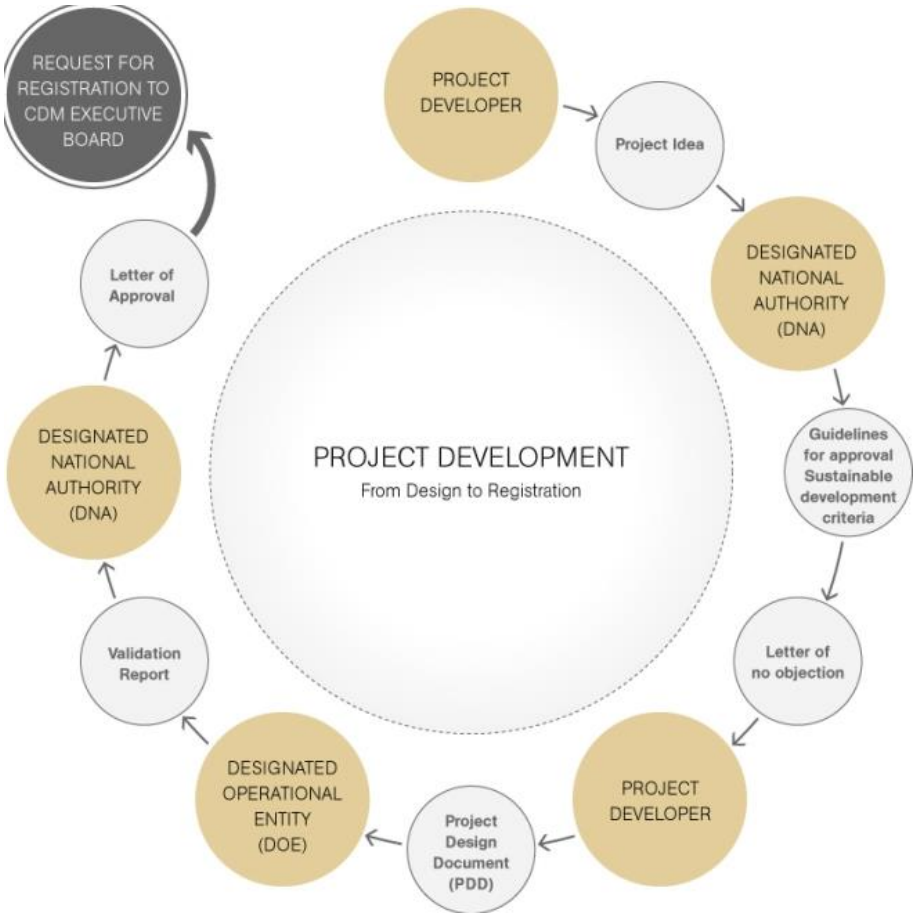


**Figure 14. Designated National Authority Diagram. Source: UNFCCC-CDM**

Madagascar's DNA came into being by decree on February 6 2010, effectively becoming the authority in charge of CDM and other carbon projects (excluding REDD). Its office was in the Climate Change Office, DCC (*Direction Changement Climatique*), which is in turn part of the General Office of the Environment, DGE, (*Direction Générale de l'Environnement*), within the Ministry of Environment and Forests, MEF. This was not the only General Office within the Ministry, however, since the MEF was itself the result of a merge between the Ministry of Water and Forests, and the Ministry of Environment, which took place around 2008[131]. The DGE then worked in parallel to the General Office of Forests, DGF (*Direction Générale*

131 A more recent Ministry re-organisation has turned the MEF into the MEEMF, *Ministère de l'Environnement, de l'Écologie, de la Mer et des Forêts*, the Ministry of the Environment, Ecology, Water and Forests.

*des Forêts*), a situation that has led to a recognised conflict, mostly over funding (see Bidaud 2012:149–150). For TAMS, but presumably with a view towards future BioCF projects, a further entity was set up, probably as a fix to this conflictive situation: the Biocarbon Fund Coordination Unit or, UCFBC, '*Unité de Coordination des Fonds Biocarbone*', headed by a member from the DGE, along with a colleague from the same office, and two members from the DGF.

This created a 'complicated' institutional structure in the eyes of the rest of actors that operated at a national level because TAMS funds were channelled through the DGF, as reforestation project, while the DGE held supervisory power over TAMS' implementation as carbon project. The UCFBC was thus divided between two competing offices, and it was in this parallel structure, many actors claim, that things got 'stuck'. As an anonymous informant involved in TAMS' organisational structure at the national level explained during our interview:

> 'In the Ministry there is DGF and DGE: those two are fighting each other for money. And one of the problems with TAMS was that the DGF had the money for TAMS, in addition to the money from CI, but the DGE deals with the signature of carbon projects etc., and they said 'we are in charge of the project, so give us the money so we can manage it'. That was one of the problems. Environment is newer than the Forest … They are newer but don't have funding'.

Although this conflict was not overtly admitted in my interviews with either the DGE or DGF, an officer at the former did suggest that the work of the UCFBC was not 'sufficiently valorised', in the sense that funding only flowed through other channels.

This competition over TAMS and its funding mechanism had dire consequences for the project as a whole. With funding channelled through

one office, and validations managed by the other, the dispute between DGs led to serious 'blocks' and 'halts' (in project actors' words) due to which funds would not be released, or validation of operations would not be granted. When problems arose, they were delegated to others, with further delays in project implementation. Along with a 'complex' administrative structure, where invoices and their approval travelled through varied and different channels, 'time gaps' became an obstacle to work on the ground, because both workers and trees were subject to their own, different temporalities. Reforestation work, for example, was dependent on the temporality of trees, and delays resulted in important levels of tree mortality. When funding halted for four months during the rainy season, the transplanting of seedlings had to be delayed further until the end of the dry season, with consequent loss of tree seedlings. As could be expected, this also had a huge impact on the additional costs of reforestation: at a given point, out of the projected 900 hectares to be reforested, only 53 had been completed. Delays in payments to reforestation workers in Andasibe, on the other hand, led to a disruption of social life in town because credit based on the expectations of TAMS' wage payments had already been given out by local businesses. At a certain point in time, Mino recalls, FAs[132] were receiving death threats, family members could not honour their responsibilities with each other, children were not attending school, businesses were closing down and ANAE would not even dare going to Andasibe. The 'halts' and 'blocks' that resulted from disputes between DGs at the Ministry level had a great impact in the operation of TAMS on the ground.

*Entangling Potentials*

In the previous sections we saw how efforts to produce carbon as a property object with clear owners drove TAMS into complex situations as a

132 Facilitating Agents—local organisations implementing reforestation on the ground.

result of carbon's necessary entanglements with trees, land and people—past, present and future. The idea of a sole carbon owner, the GoM, might have seemed an appropriate move in bypassing a complex multiplicity of actors. Or it might have been a governmental demand that could not be turned down. In any case, multiplicity returned with a vengeance. Were trees in TAMS part of a reforestation project, and therefore the domain of the DGF, or were they part of a carbon project, and thus clearly set within the DGE? As we have seen, they were both—and it was in this unexpected entanglement that many actors identified TAMS' *coup de grace*.

The question of property in TAMS was not simply a matter of establishing who the carbon owners were because TAMS was productive of much more than carbon credits. TAMS also involved its own 'projectness', a feature capable of mobilising people, resources and imaginations beyond the Certified Emissions Reductions.

At its most obvious, TAMS was productive beyond carbon credits because it drew on a number of funding sources at different points in time. The report *Les marchés de carbon forestier/Bringing forest carbon projects to the market* (Chenost et al. 2010:152), for example, states that the investment cost for TAMS[133] with 591 ha reforested, had been 1,600,300 US$, and the operation costs had been 750,000 US$ over five years. But it was also productive of a governmental body, the UCFBC, which occupied space in a Ministry ridden with competition and rivalry. The claims by the DCC of the UCFBC not being 'valorised' may not only refer to the allocation of funding, but could also be seen to contain notions of institutional legitimacy and prestige directed against the DGF. Although this is just speculation, TAMS, as an international pilot project, may have been seen as an object that would legitimise the DGE as key player in the new environmental arena that was unfolding at the time. When the BioCF pulled out, in fact, the DGE had contacted ANAE and CI to reassure them that the Ministry was not dropping

133 Here called the *Corridor Ankeniheny-Zahamena, volet AR*.

the project, for they had already invested a lot in it. Legitimacy and prestige, on the other hand, were not just matters of rivalry between ministerial directorates, however, but also between the government and international NGOs. There was an apparent competition, in fact, between the Ministry and CI to appear as project leader in front of international actors. As a carbon project, then, TAMS did not just conjure (cf. Tsing 2005) the potential value of carbon credits, but also of itself as pilot project: an object of prestige, legitimacy and both present and future funding.

## Conclusion

### *The complexity of making things simple*

As a fungible object that can be identified, quantified, managed and exchanged, the carbon credit in its commodity form has a powerful capacity to conjure ideas of simplicity. Molecularity, technicality, efficiency and economic rationality, among others, embody a particular 'appeal to simplicity' (McAfee 2003:204) in the management of climate change, not dissimilar to that of the gene in molecular biology. The connections between genes and carbon molecules pose, in fact, interesting parallels. Just like the US claimed to have found 'the secret of life' (Kay 1993:16) in the 1930s through molecular biology, carbon (and energy) has also been presented as 'life in its most fundamental sense' (Alexander 2005:464), since everything, after all, is made out of carbon molecules. Both elements, in turn, have been treated as single, bounded entities that are amenable to control and commodification (McAfee 2003), where they can be abstracted from their temporal and spatial contexts and where clear property rights can be established. The 'molecular vision of life' (Kay 1993) from this perspective is presented as a 'frictionless' (Tsing 2005) one. The work that must be done to bring them about, as we have seen, is not all that smooth.

We have seen how processes and technologies aimed at disentangling carbon from Andasibe's forests were fraught with complications, and were,

in many instances, productive of further entanglements: if carbon had to be defined in order to be known and owned, this led to messy entanglements with Malagasy civil law, opening up the complicated question of land tenure; the land certificate as 'separative technology' (Slater 2002), on the other hand, brought up the risk of re-entangling carbon to its original landscape, endangering the very future of carbon itself; the need to produce carbon from reforested parcels in Andasibe meant having to deal with rival and competing governmental offices; finally, TAMS itself, as productive of value beyond the Certified Emission Reductions, became caught in a mesh of entangling relationships with dire consequences for the project as a whole. Instead of external to the carbon credit, then, complexities often emerged as its effect.

Through an analysis of the processes set in motion to turn carbon into an economic object that could be owned and exchanged—that is, commodified—we have seen the various complications that TAMS ran into. A large part of this complexity, it could be argued, derived from the *nature(s)* of carbon credits: from the type of objects they are and the way they are brought into being. The concept of *nature(s)* in this case aims to convey the specific socio-material landscapes to which trees are rooted on the one hand, and the specific properties of the commodifiable object that carbon credits are assumed to be. In a sense, land/trees and carbon is a mirror image of the binary that Callon sets up to introduce the concepts of entanglement/disentanglement as he opposes money to organs. Money, he argues, is one of the easiest objects to disentangle since it is, in essence, 'already framed: cold, circulating, constantly changing hands, going from account to account' (1998c:34). As an object whose function is to provide equivalence and aid the circulation of commodities, money is already nearly disentangled in its totality. At the opposite end we find human organs, which are, by definition, 'entangled in the body of the donor and through him his family or circle or friends' (Waldby and Mitchell 2006:68) and pose a particular difficulty when it comes to processes of disentanglement since the

organ must be both materially removed (issues of time) and is usually transferred as a gift, in 'a limited form of circulation which honors the material and social embeddedness of organs' (Waldby and Mitchell 2006:68)[134]. Carbon credits and trees suggest a similar parallel, this time, however, contained in the same material element: whereas carbon is conceived of as a bounded form of ultimate equivalence (Alexander 2005) to be traded at a global level, trees are the archetype of permanence and locality, their roots a powerful metaphor for their entanglement with their socio-material contexts. It is due to the oscillation between these two *nature(s)* or elements—the all-pervasive entanglement of trees/land and their necessary disentanglement for the production of CERs—that, I argue, forest carbon projects are particularly 'complex' endeavours.

Oscillation, a continuous movement between alternative states, has been employed to account for particular forms of complexity (Law and Mol 2002b:17–18). In her analysis of medical comparisons between treatments and patients' conditions before and after treatments, Mol argues that a particular type of complexity derives from diseases 'being more than one but less than many' (2002b:247). Instead of single or plural objects, diseases waver between the two:

> 'although intermittent claudication is not 'really' an encroached vessel lumen inside the body, of which pain surfaces as a symptom when a person is walking, lumen width and pain are not entirely independent either' (Mol 2002b:247).

The view of disease in this case is one in which there is neither a singular object made up of 'underlying structures and emerging symptoms', nor multiple ones that result from the fragmentation of independent

134 Yet money can, and often is, subject to processes of re-entanglement, through ear-marking, for example (Zelizer 1994), and organs can be turned into particular types of commodities by erasing their history and links to previous owners, as in the case of the certain organ markets (see Waldby and Mitchell 2006).

elements. It is in this 'relation of in/dependence' (Mol 2002b:247), or an oscillation between things that are both connected and disconnected, that complexity arises. 'In a complex world', Mol and Law claim, 'there are no simple binaries' (Law and Mol 2002b:20).

It could be argued, then, that complexity in TAMS, and in forest carbon projects in general, stems from the oscillation between the 'necessarily ambivalent' (Law and Mol 1998:29) *nature(s)* of carbon credits, where roots both enable and impede their becoming. In this sense, then, complexity may be seen as the result of the 'signature tension' (Robertson 2000) of forest carbon projects in processes of commodification, as I described it in chapter one: the fact that, along with fragmentation and abstraction—or as we have seen in this chapter, disentanglement—carbon credits can only come about through the production of very specific and grounded forms of nature, and their consequent entanglements with socio-material contexts. The interplays between the need to root in order to abstract, and the need to abstract while remaining rooted, translate into very 'complicated projects'.

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Over the last five chapters I have explored the various shapes that carbon takes as part of a forest carbon project in the specific landscapes where it is deployed—what I termed, at the beginning of this dissertation, carbon's multiple social lives.

Arguing that the production of carbon as a 'tradable bit' of nature entails a double movement between grounding nature in specific landscapes *in order* to abstract and fragment it—forest carbon project's 'signature tension' in Robertson's (2000) terms—I have presented the 'proliferating' (Hayden 2012) forms of carbon that emerge through diverse material and discursive practices.

In chapters three and four I explored the social life of carbon in its credit form, as a specific form of value with a logic of its own, and its

interplay with questions of value and waste in the forests of Andasibe. In chapter three we saw how, through its engagement with carbon markets, TAMS transformed from 'the project to restore the fallows' to the project 'to bring back the forest'. Carbon, in its proposal of a future of absolute economic and ecological value, negated any past, present and future trace of *tavy* or the fallows, which were relegated to the category of waste. In addition we saw how carbon credits' logic of value transformed TAMS' internal structure with fundamental consequences for the communities involved, as they went from being potential carbon owners to mere beneficiaries of an undefined form of development.

In chapter four, on the other hand, we saw how this projected future of absolute ecological and economic value where *tavy* had no place was but one side of the story. *Tavy*, as constitutive of the threat of scarcity on which forest carbon projects are premised, turned out to be, in fact, highly generative of value. Through a historical account of the economic and political role of forests in Andasibe we saw how this was not a novel phenomenon: *tavy*, while always treated as a wasteful and undesirable practice by extra-local powers, had been integral to these actors' projects of forest valorisation. Although Madagascar's position in global environmental imaginaries as representative of a natural time outside of history tends to obscure the political and economic pasts of Andasibe's rainforest and present conservation as a novel way of value production, we saw that carbon establishes very specific, historical continuities.

From its 'credit' form I then moved on to other less explicit or stable social lives of carbon as part of TAMS. In chapters five and six we saw how, as carbon entered the rural landscapes of Mahatsara, it began to lose some of its stability, sometimes also disappearing from view. In chapter five, for example, carbon dissipated into a more general experience of power(lessness) as an implicit element of what I termed the 'environmental state'. In its curtailment of Betsimisaraka ideals of 'forward movement' (Keller 2008) through restrictions on the practice of *tavy*, the

'environmental state', and carbon as part of it, was experienced as a form of spatial and temporal oppression, articulated around the notion of *voatery*. Although not explicitly talked about, then, carbon in this case was inherently entangled with the practice of *tavy* in the interplay between agricultural expansion and the fixity of the carbon sink.

In chapter six, on the other hand, I explored the social life of carbon as natural resource and the implications of its particular (im)materiality for those involved in its extraction through a look at the infrastructures, labour regimes and forms of exchange and value production that were set up in order to 'extract' carbon in Mahatsara. A comparison between past and present experiences of 'carbon labour' for men in Mahatsara—as part of the graphite mining industry and as part of TAMS— revealed the specific traits of contemporary forms of carbon and carbon labour as highly volatile: temporary, intangible, and socially detached. As carbon failed to materialize in any locally expected form—either through work, money or benefits—it led, in turn, to feelings of deceit.

All along, then, we have seen how, as carbon was put to work in the forests of Andasibe and Mahatsara, its shapes shifted and wavered, leading to a multiplicity of forms and lived experiences. In this final chapter, in fact, we have seen how this multiplicity was not simply an effect, but rather a fundamental necessity of forest carbon projects. In order for carbon to emerge as a mobile and bounded object, it needs to remain entangled with its socio-material landscapes: carbon necessarily wavers between its rooted and abstract forms, its commodity properties being continuously exceeded by carbon as something else. Far from a 'bare molecule' (Barry 2005), then, CO2 as part of global forms of environmental governance, appears as a multiple object, variously 'done' and 'known' (Mol 2002a). But what does carbon actually *do*?

A recent comment by Hannah Apple (2015) on the book 'The social life of money' (2014), points to some important similarities between the multiplicity of carbon and that of money as explored by the author, Nigel

Dodd. Against a monetary realism that treats money as 'a thing'—'as ontologically singular, homogenous and homogneizing' (Appel 2015:428)—the book presents money in various guises: 'as process, culture as constitutive of money forms rather than merely an external influence, money as a repertoire of scales, asymmetrical exchanges, and as an instrument of collective memory' (Appel 2015:428). This multiplicity, in turn, is presented as a space for possibilities due to money's 'capacity of reinvention' (Dodd 2014:272). But this claim to multiplicity and the possibilities it brings about, while theoretically consistent, worries Appel because, in her own words, this theoretical insight

> 'can *seem* to suggest that, in showing money to be multiple, flexible, and capacious, we have then somehow undone its power; that this mere theoretical assertion has actually undone the "real" power of money in the world' (2015:428 emphasis in original)

Far from it, Appel reminds, us, 'money can, and often does act as a brutal singularity...A thing' (2015:429).

In the final chapter of this dissertation I want to leave carbon's multiplicity as it has appeared in the landscapes of Andasibe and Mahatsara, and move on to consider carbon in its 'brutal singularity' (Appel 2015:429). From the ways in which carbon is variously done in a specific locale, then, I turn to consider what carbon actually *does* as key object in global forms of environmental management. I will do this by bringing together, and further exploring, the mutual and productive connections between time and carbon that have appeared throughout this dissertation, as well as their political implications. As an object that has re-structured the relationships between industrialized and developing countries through global forms of environmental governance, carbon, I will argue, establishes new forms of inclusions and exclusions as it forecloses the future for some, while opening it up for others.

# Chapter Eight: Uncommon Futures

## Introduction

> *BIG BEN STRIKES the hour. In a muted, ghostly room, the custodians of the future convene. Keeper of the Board Books: Mektoub, it is written. And they don't want it changed. 'If three hundred men—then three thousand, thirty thousand. It could spread everywhere. It must be stopped,* now*'. 'Our man Martin is on target. Quite reliable.'*
> William S. Burroughs, *Ghost of Chance* (1995:8)

As might be recalled, Martin was the emissary sent by the Board to sabotage Captain Mission's project of Libertatia, for in his quest to demonstrate that humans and nature could live in 'relative harmony', Mission had tampered with the 'prerecordings' (Burroughs 1995:8), which the Board, as custodians of the future, did not want to be altered. The result, as we know from the introduction, was the blowing up of the Garden of Lost Chances where Mission's lemur friend Ghost lived, and the unforeseen release of extinct and bizarre diseases and viruses that had spread worldwide and brought an end to humanity.

In this final chapter I explore the mutual and productive connections between time and carbon as a key object of global forms of environmental governance to mitigate climate change. Like the Board in Burroughs' story, I will argue, carbon works to administer time by opening the future for some, and foreclosing it for others, establishing, in turn, diverse and unequal global trajectories.

Throughout this dissertation we have seen the varied ways in which carbon and time are mutually entangled as part of a specific forest carbon

project. In chapters three and four, for example, we saw that that the production of carbon value entailed —and fundamentally emerged from— very specific articulations between the pasts, presents and futures of Andasibe's forests in relation to *tavy*. Chapters five and six, by contrast, revealed particular temporal experiences for people in Mahatsara as a result of carbon in two different guises. As an implicit element in the interplay between movement and fixity in agricultural and reforested landscapes, we saw in chapter five how carbon was experienced as part of an 'environmental state' that regulated, and impeded, social and material expansion for *tavy* farmers, leading to both spatial and temporal forms of oppression. In chapter six, on the other hand, although the temporal implications of carbon were not as evident as in the previous chapter, we saw how carbon labour was marked by notions of temporariness, in contrast to past experiences of permanent work for the graphite industry. In chapter seven, finally, we saw that processes to disentangle carbon were often impeded by its parallel entanglement with past and future relations (such as in the case of land tenure) as part of reforested trees and their socio-material contexts. We have seen, therefore, as Ferry and Limbert (2008) have argued for natural resources, that the relationship between carbon (in its multiple forms) and time goes 'in both directions' (Elizabeth E. Ferry and Limbert 2008:4), as carbon is both produced by, and productive of, particular temporalities.

In this chapter my aim is to take these connections further and, rather than just explore them through a specific forest carbon project, consider them from a more general perspective. Therefore, the chapter may be seen less as a conclusion—in the sense of bringing things to a close—and more as an opening up of a specific theme that has appeared as an important element in many of the ethnographic chapters here presented.

In the next sections I will argue that carbon, as key object in the management of climate change, attends to a recent realisation of temporal limits to (capitalist) growth, and, at the same time, aims to re-work and

overcome them through temporal strategies: a sort of 'temporal fix' in Harvey's sense (1982; 2001). Forest carbon projects such as TAMS can in a sense be seen as an instance of a global re-distribution of time, where the future becomes closed or fixed in some places, and open, or mobile, in others. In the final section of this chapter I turn to the 'Anthropocene' as the embodiment of contemporary articulations between ideas of temporal limits to growth and socio-natural presents and futures, and argue that this temporal concept hides, in fact, diverse and unequal trajectories. In the emergent global chronographies of the Anthropocene that carbon brings about through a re-worked relationship between time, people and nature, we will see that 'Our Common Future' is neither singular, nor shared.

**From spatial to temporal limits to growth**

'Nature', Cindi Katz has argued, 'changed in the 1970s' (1998:46). Over the decade that went from the take-off of American environmentalism with Rachel Carson's 'Silent spring' in 1962 to the 1973 oil crisis, nature ceased to be the 'open frontier' for unlimited economic expansion that capitalism had until then taken for granted. The report by the Club of Rome entitled 'Limits to Growth' (1972) may be seen as the embodiment of this change of perspective, as it proclaimed the 'finiteness' of the Earth (Cooper 2008:16). Published in 1972, 'Limits to Growth' projected an unsustainable future for life on earth if current trends of resource depletion, population growth and waste build up continued, and warned against the 'insurmountable' (Cooper 2008:16) limits that economic expansion would face if no action was taken. Interestingly, this was also the time when oil companies gave up a discourse on oil as 'an almost limitless resource' (a discourse, in turn, that had been a pillar of the dominant view since the 1930s of 'the economy' as 'an object' capable of unlimited growth) as they began to anticipate its end (Mitchell 2011:189). As one of the most iconic images of this era of newly found planetary limits we have the photograph of Earth taken by the Apollo 17

mission in 1972 and which became a globally circulated emblem of the environmental movement during that decade (Lekan 2014). Viewed from outer space the 'Blue Marble' or 'Blue Planet' appeared as a glowing and beautiful—yet fundamentally finite—object.

At this stage, Katz argues, nature was 'remade for capitalism' (Katz 1998:46). In an effort to overcome the limits imposed by environmental degradation (limits that were inextricably also social, as O'Connor (1998) argued), nature became an 'accumulation strategy' in its own right (Katz 1998:60). Corporate capitalism thus turned to 'a green economy' through nature's commodification and privatisation (see chapter 1), observed, for example, in the proliferation of new biodiversity reserves. The result, according to Katz, was 'a more intensive form of nature production' (1998:46).

Katz has portrayed this intensification or remaking of nature as a kind of 'involution' (1998:46) similar to the one undergone by the concept of space in the early 20th century. This process of space re-making or 'involution' in Katz's sense, began, according to Smith (1990), when planetary expansion came to an end with the final partitioning of Africa in the 1880s. From then on, capitalist expansion became a matter of reworking spatial divisions through an 'internal differentiation of global space' (Smith 1990:119–120), leading to 'uneven development' as the 'hallmark of the geography of capitalism' (Smith 1990:4). According to Katz, then, just like space in the early 20th century, nature was re-made in the 1970s to overcome the newly found limits to capitalist growth.

Contemporary forms of nature commodification, which have departed from simply creating protected areas and have turned, as we know, to the making of 'natural' bits to be traded in global markets (see chapter one), may be seen as a new stage in this re-working or 'involution' of nature that began in the 1970s, but with a twist. Importantly marked by emerging processes of financialisation (Sullivan 2013), this new phase, I suggest,

attends not just to spatial, but also to temporal limits to growth[135]. Although this does not mean that spatial limits have been either overcome or forgotten, the last two decades reveal an emerging concern with temporal ones: from the view of a finite Earth as seen from—and in—space, we have now moved on to the Anthropocene (a new temporal relation between society and nature that I explore below) as the most iconic element of 'our times'. With its 'tipping points' and dangerous 'acceleration rates', the Anthropocene powerfully evokes the idea that we are 'running out of time'.

The 1987 Brundtland report entitled 'Our common future' may in fact be seen as a turning point in the transition from spatial to temporal limits, since it marks the moment when the question of time became inscribed and problematised into the expansion of capitalism. The report, which hinged on a wide array of environmental, social and economic problems such as population growth, food security, energy or urbanisation, presented 'a new reality from which there is no escape, [that] must be recognized—and managed' (WCDE 1987:11). To this aim, it proposed a view of 'sustainable development' as one that 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCDE 1987:16). The Brundtland report thus inaugurated a new way of thinking about and relating to time and the environment, since (capitalist) 'development' appeared as endangered in the future. Within this view, however, limits to growth were not seen as 'absolute' but rather a matter of technological and social organisation, to be 'both managed and improved to make way for a new era of economic growth' (WCDE 1987:16). This new era thus implied the need to re-work and manage nature to secure 'a common future', that is, to overcome temporal limits. It is in fact highly telling that only five years later, in 1992, the revisit to the Club of Rome's 'Limits to Growth' report entitled 'Beyond the Limits' claimed that 'limits to growth

135 Undoubtedly, as Munn has argued, 'in a lived world, spatial and temporal dimensions cannot be disentangled, and the two comingle in various ways' (Munn 1992:94). My main focus in this chapter relates to temporal dimensions, but I acknowledge that these cannot be isolated from spatial ones.

were time-like, rather than space-like' (Cooper 2008:16): time was in fact 'the ultimate limit' (Meadows, Meadows, and Randers 1992:180). It is at this stage, then, that we find a temporal involution in the sense described by Katz for space, since, from now on, the future will be a key object of intervention through environmental management at a global level. In this new scenario, carbon emerged as a fundamental element.

**Carbon, an economy of the future**

The 1992 United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, may be seen as a key moment in this reworked relationship between time and socio-natural futures since it is here that the management of the future in relation to environmental governance begins to be globally organised: the United Nations Framework Convention on Climate Change (UNFCCC) is adopted with the stated aim of 'stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system' (UNFCCC 1992:4). Carbon emerges here as 'a critical object of intervention' (Lansing 2011:739) as it is made to stand for other types of greenhouse gases and it is established that by the year 2000, carbon dioxide levels—or, what is the same, accumulated carbon waste—do not exceed those of 1990. To attain this view of the future, five years later, along with an agreement on emissions reductions, a global system of carbon trading is put in place through the Kyoto Protocol, which will come into force in 2005. Carbon trading may thus be seen as one of the main concerted efforts taken at a global level to manage and overcome the latest and most pressing crisis for economic growth, now contemplated in temporal terms: climate change.

Yet carbon's relationship to time is not simply that of a strategy, or solution, to overcome temporal limits to growth. As I show in the next sections, the CDM, as a mechanism that re-arranges so-called First and Third

World relationships through carbon trading may be seen as a way of 'buying time' in various ways. Carbon credits and specifically those of forest carbon projects such as TAMS, in turn, may be argued to be temporal objects in the most literal sense since they are made out of—and at the same time create—very specific temporal articulations. Let us see how.

*Buying time*

Emissions trading, as we saw in chapter two, emerged as a result of a debate between the most appropriate ways of dealing with industrial waste, CO2 emissions in the case of carbon trade. Instead of a direct tax on emissions, trading in carbon credits, or permits, was posed as the most cost-effective and efficient initiative: a 'transitional' mechanism that would allow polluters to progressively lower down their emissions and adapt to a low-carbon (or even fossil fuel-free) economy. This was the 'flexibility' conferred to polluters by carbon and other forms of emissions trading: the capacity to delay structural change (such as 'switching' to alternative forms of energy) by trading in carbon credits amongst themselves. Whereas some polluters, from this perspective, would have been able to make the most out of reducing their emissions or transitioning to low-carbon technologies, for example, others (usually the biggest polluters and therefore those with most difficulty to make the 'switch'—and, perversely, those that most needed it) could defer action by simply buying credits. The cap-and-trade system[136] in this sense may be seen as a mechanism for trading in rights not just to pollute, but also to defer (expensive) action: a way of 'buying time'. But this idea gains a greater force when considering carbon offsets as part of the CDM, since the mechanism now re-arranges this market of deferrals by allowing emissions to be reduced in developing countries and be sold to polluters in industrialised ones, who, in the meantime, can keep a business-

136 The cap-and-trade system entails the establishment of a cap on emissions in a national territory where allowances are sold or given out to polluters who can then trade among them.

as-usual scenario. Although the transfer of resources (technology, sustainable development and revenue) to developing countries has been invoked as a positive effect of carbon markets, the mechanism poses important questions for the future of these countries, since emission reductions establish a system that necessarily extends into the future. When the time comes for developing countries to reduce their own emissions, as Clark and Knox-Hayes point out, 'the low-hanging' fruit will have already been sold, thus imposing 'a greater share of the costs to make the same reductions their European predecessors have already made' (2011:15). That is, through the CDM, industrialised countries are today acquiring future possibilities of emissions reductions in developing countries, at the same time as deferring structural change. The political economy of carbon offsets thus institutes a system where low-carbon futures are (cost-effectively, or what is the same, cheaply) manufactured in developing countries and consumed—in the present—by industrialised ones.

But the idea of 'buying time' gains an even greater meaning when considering the kinds of objects offsets are, the way they come into being and their temporal implications in the specific locales where they are generated, as explored throughout this dissertation.

*Carbon credits as objects made out of time*

In chapters three and four, as I explored the social life of carbon in its credit form and its interplay with notions of value and waste in the forests of Andasibe, we saw that credits or reductions arise out of very particular temporal articulations. In chapter three we saw that carbon credits' logic of value resulted in proposals of a future of absolute economic and ecological value in the forest where *tavy* (and the fallows) as waste could not be contemplated. It was here, I argued that we could locate the transformation of TAMS from the project to restore the fallows, to the project to bring back the forest, since, in order to maximise carbon value, any past, present and future trace of *tavy* had to be erased/negated. But this, as we saw in chapter

four, was only one side of the story since *tavy*, while kept in a degrading and degraded position, was fundamentally productive of carbon value: it was the articulation between a past of *tavy* and its projection into the future that created the threat—and hence the imagined future scarcity or absence—through which carbon value could be conjured (Tsing 2005) and generated. As a specific form of value, I argued, carbon credits were premised both on the projected (and promissory) future absence of *tavy*, and its imagined presence. This was not just the result of the specific characteristics of TAMS because, as we saw, these two future scenarios emerged out of what I termed the 'constitutive elements' of a forest carbon project, the concepts of 'additionality', 'baseline', 'permanence' and 'leakage'. 'Additionality', the requirement that emissions *would have* occurred without the project, and the 'baseline', a mean projection of past deforestation through which reductions could be calculated, were thus fundamentally based on an imagined future of *tavy*-based carbon emissions, what Lohmann has called a 'counter-factual scenario' (2014:471). It was only through this double scenario of alternative-yet-complementary futures (with and without *tavy*) that the need and value of carbon credits (its additional character and its baseline) could actually come about.

From this perspective, it may be argued that the type of value carbon credits create, just like that of financial derivatives[137], is a 'sign which creates itself out of the future' (Rotman 1987:96 in ; Maurer 2002:18). Carbon credits, or offsets, are effectively made out of speculative futures.

The relocation to the speculative future may in fact be seen as a central trait of emerging forms of commodified natures (most clearly seen in processes of nature financialisation, since financialisation is fundamentally premised on the speculative future) and other forms of value that derive from 'life itself' (Rose 2001). As we saw in chapter four, carbon credits share key similarities with genetic material in bioprospecting agreements in

137 This is not the only similarity between carbon and financial derivatives. For a detailed account of these see Lohmann (2010).

Mexico (Hayden 2003) or prospective oil in Santo Tome Principe (Weszkalnys 2014) in that they all derive their generativity in the present through their imagined loss, or scarcity, in the future. Similarly, in the context of biotechnology, both Franklin (2005) and Waldby (2002) have noted the promissory capacities of stem cell research and techniques in their claim to overcome biological limits (of age and decay, for example) through their regenerative potential. Often portrayed as revolutionary, Franklin argues, these 'regenerative narratives' (2005:61) point to future possibilities of 'unlimited production' (2005:65) (of tissues, stem cells, etc.), and are structured around a 'rhetorical fabric of hope, health and an improved future through biological control (2005:59). In all cases, then, the value of these types of resources seems to be located in the speculative future, and it is a value, in turn, that is often posited as a way of overcoming limits. In her extensive analysis on the simultaneous rise of biotechnology and neoliberalism in the US, Cooper has in fact argued that 'neoliberalism and the biotech industry share a common ambition to overcome the ecological and economic limits to growth associated with the end of industrial production, through a speculative reinvention of the future' (Cooper 2008:11). Although Cooper explores, among others, the case of the US petrochemical sector and its move from extractive industries into genetic technologies of molecular biology during the 1980s, her view that the profits of post-Fordist economies 'will depend on the accumulation of biological futures' (2008:25) seems an apt way of illustrating the type of value that emerging forms of commodified natures conjure. The idea of 'buying time' as a central element in the political economy of carbon and other emergent forms of commodified natures thus acquires an almost literal meaning.

*Fixing the Future*

In her analysis of the particular forms of 'spacetime construction' that take place in carbon markets, and bringing attention to the counterfactual through which reductions are calculated and credits are granted, Knox-

Hayes has argued that 'carbon markets control things that never happen, by giving value to the prevention of a future occurrence' (2010:956). Rather than just valuing 'future time', like financial markets do, then, carbon markets also need to value 'non-time'. From this perspective, according to Knox-Hayes, 'emissions reductions have neither real space nor real time since the emission never occurs' (Knox-Hayes 2010:956). Over the course of this dissertation however, we have seen that both the space and time of emissions reductions are, in fact, very real.

What are the consequences, then, of this political economy of time, or futures, that carbon institutes through the CDM in the specific locales in which credits are generated? Following Methamnn (2013) and Lohmann (2005) I suggest that what CDM projects, and forest carbon projects in particular, *do,* is close down the future in some places, in order to open it up in others.

As we have seen, carbon credits can only come about through the articulation of two alternative-yet-complementary futures, 'with and without' the project. According to Methmann, these two futures, in turn, need to be fairly similar, otherwise comparison could not take place. This can be easily seen in TAMS in the comparison between a future of carbon value with no *tavy* in it, and a future of waste with only *tavy*. We can begin to see how forest carbon projects entail the limitation of possibilities in those places where they are carried out, since credit generation is premised on two—and only two—possible futures. This, according to Methmann, posits CDM projects as 'governing the future as 'future perfect' (Bigo 2007:31), in the sense that:

> 'By monitoring what is happening today, this course of action is prolonged and extrapolated into the future. The future is already determined and complete, it is already here. And we can only attempt to alter it slightly, as the basic parameters are already fixed. In effect, the CDM

> simply administers a present which has always-already become our future' (Methmann 2013:15).

The futures that forest carbon projects propose in specific locales are therefore not just speculative but also, and fundamentally, preemptive. From a slightly different perspective, this 'administering' of the future by CDM projects could be seen as an instance of what Born has termed 'technologies for producing teleology' in reference to the deployment of 'systematic techniques to conceptualise and protend the future: to bring the future into the present, delimit it and close it down' (Born 2008:295). Although Born's analysis is done in the context of techniques employed by IT and media industries to deal with future market uncertainties, we can see how this idea of 'protending' the future is effected by forest carbon projects through their temporal articulations. In the case of TAMS, we can see, the future of Betsimisaraka landscapes is already pre-determined and delimited; it is fixed and cannot be altered.

This, however, entails a very significant paradox because it means, as Lohmann has observed (2005), that whereas the future appears as known and singular for those targeted by an offset project (*tavy* farmers in the case of TAMS), the concept of 'additionality' implies that project initiators are left out of this pre-determined future, since they alone have the capacity, or agency, to alter the already established course of (imagined) action. In Lohmanns' words, this 'treats carbon project sponsors and managers as free agents while implicitly demoting other actors into passive objects of deterministic calculation' (2005:218). They are, in Burroughs' sense, the 'custodians of the future', in that they both determine—yet are above—the 'prerecorded future'.

Since the credits generated through this fixing, or closing down, of future possibilities in specific landscapes are then integrated into a market and acquired as a form of delaying structural change and keeping a business-as-usual scenario (as explored above), we can begin to see that the

political economy of carbon that the CDM sets in place is one of, essentially, time: it entails the delimitation of future possibilities in those places where it operates, in order to open them up elsewhere. Far from 'Our Common Future', as the Brundtland report proclaimed in 1987 through its vision of 'sustainable development', contemporary strategies to deal with limits to growth seem to point to a redistribution of futures along historical lines of inclusion and exclusion.

From this perspective, carbon may be seen as a (loose) parallel to Harvey's notion of the 'spatial fix'[138] (1982; 2001), this time in its temporal form. The 'spatial fix' in Harvey's sense aimed to designate 'capitalism's insatiable drive to resolve its inner crisis tendencies by geographical expansion and geographical structuring' (2001:24). Overcoming limits thus entailed, according to Harvey, temporary solutions of spatial reorganisation carried out through the interplay between fixed and mobile forms of capital. We can therefore see how carbon operates as a 'temporal fix' in Harvey's double sense: both as a temporary solution, or 'fix', to overcome capitalism's newly found temporal limits, and as a form of temporal reorganisation, where time, and more specifically, the future, is 'fixed', or made stable in certain places, so that it can be opened up, or made mobile, in others.

**Carbon in the Anthropocene**

Coined in 2000 by Nobel prize-winner chemist Paul Crutzen, the Anthropocene aims to designate a new geological 'epoch' distinct from the Holocene and marked by man's disturbance of the Earth's ecological systems. Although its value as geological epoch marker is a contested issue (Castree 2014), the concept has travelled fast outside of its original setting, and it is currently being used both in and outside academia, most often as a

138 I employ the notion of carbon as temporal 'fix' as a loose parallel to Harvey's, which is, in itself, 'a loose and heterogeneous concept' (Jessop 2006:146).

way of bringing attention to the need for urgent action in the face of climate change and future environmental collapse.

Swanson et al. (2015) have reviewed the concept of the Anthropocene as an emergent and inchoate academic field through an analysis of four diverse conferences centred around it between 2009 and 2014. They argue that the Anthropocene 'not only marks a geological time, but also a scholarly one' (2015:150), since it has captured the imagination of scholars across a wide range of fields. Much of its use in the social sciences has been related to its promise to do away with the nature/culture divide, as it bridges between the human and natural sciences. The Anthropocene, as it is currently being used, seems to confirm that we have, indeed, 'never been modern' (Latour 1993). In any case, the authors point towards the multiplicity and instability of the concept—being 'more than one and less than many'—as part of a 'field-in-the making' (Swanson, Bubandt, and Tsing 2015:150).

I here want to focus on the temporal imaginations, and implications, that the Anthropocene conjures and brings about, both in and outside academia. As marker of 'a new temporal unit' that presents humans as 'the most significant' natural force (Swanson, Bubandt, and Tsing 2015:164), the Anthropocene suggests a new way of thinking about, and relating to, the entanglements between nature and people in relation to time. It evokes, I argue, a paradoxical temporality in which humanity seems to be caught: the fact that humans seem to have taken over nature as the main force in 'making time', and yet, this is a time that endangers both nature and humans as it points towards apocalypse, or what is the same, the end of time.

The Anthropocene is thus exemplary of—or as Castree has put it, practically interchangeable with—contemporary ideas of 'planetary boundaries' (2014:437), which are, as we have seen above, imagined in temporal terms. Carbon features prominently, if not essentially, in the imaginary of the Anthropocene, for various reasons. Firstly, the beginning of this new geological epoch is often located in the industrial revolution and the consequent rise in CO2 levels as a result of coal. Secondly, the carbon

molecule also embodies the Anthropocene's key paradox: the fact that due to human intervention, this 'essential element of life' (Bridge 2011:822) now threatens life (and therefore time) itself. As a key object in global forms of environmental governance, in turn, carbon has become an essential mechanism in the management of the newly imagined future. As capitalism's latest 'fix', then, carbon aims to manage and rework the temporal limits that the Anthropocene suggests.

'Our Time', Tsing has argued, 'is the "anthropocene"' (2012:95). By exploring the temporal implications and politics that have come up in this dissertation through an ethnography of TAMS, and relating them to the political economy of carbon more generally, my aim in this final chapter has been to show that as a contemporary reworked relationship between socio-natural futures, carbon, as part of the Anthropocene, hides multiple trajectories. Rather than a general evacuation of the future (Guyer 2007), we find selective and unequal ones (see also Wilk 2007).

*Bridges*

Around 2012, a pun in the graceful Malagasy style came into fashion in the national media and public sphere whereby the *Tetezamita*—or transition, literally meaning a bridge to cross to the other side—turned into the *Tetezamitatra*—or an 'elongating bridge'—evoking the irony of what seemed like a never-ending transition. Even more ironic, maybe, was the fact that this transition was being led by the (unelected) government of Andry Rajoelina, whose party's name, *Tanora Gasy Vonona* (Determined Malagasy Youth) was a not too subtle reference to the French high-speed train TGV; Rajoelina, as Cole has argued, 'offered a fast train to the future' (2010:181).

*Tetezamitatra* in Madagascar became exemplary of the country's latest 'political crisis', marking the impasse of national forces in reaching an agreement over the holding of elections. This 'elongating bridge' was not just a commentary on the perceived freezing of the island's time, but also, and fundamentally, on its unequal effects: the fact that the living conditions of

the average Malagasy person had deteriorated at an alarming pace since the 2009 coup, while the wealth of a small elite with governmental ties seemed to be burgeoning, palpably, for example, in the unprecedented number of new and gigantic SUVs that roamed the narrow paved roads of the capital. As a famous political TV programme put it, it was evident that some were 'manoeuvring' to keep the transition going. The suspension of time in Madagascar had therefore translated into a temporality of fast decline for many, and one of exponential growth for a few. As in the case of transitions in post-socialist countries examined by Buroway and Verdery, instead of the 'unilinear movement from one stage to another' the *Tetezamitatra* as transitional period turned out to be an uneven one with 'multiple trajectories' (1999:14). In this suspended state, a small elite had productively 'seized time' (Verdery 1996) and been propelled to the future, while the rest remained caught- or 'immobilized' (Verdery 1996:46) in an uncertain and unproductive present. *Tetezamitatra* in Madagascar evoked the diverse and unequal temporalities that inhabit a given present moment.

I want to briefly return here to the similarities between carbon and the emergent field of biotechnology. The regenerative possibilities that laboratory objects, such as stem cells, conjure, seem to point to a radical change in temporal understandings and imaginations. The possibilities afforded by stem cell techniques in overcoming processes of aging and decay (or what is the same, temporal limits to life), for example, seem to imply new ways of understanding and manipulating time. 'Life itself', Franklin argues,

> 'is repositioned outside the grid of neatly brachiated channels of ancestry that was formerly the master figure of life as a systematic unity ... and life components are assembled in ways that were, until quite recently, considered to be biologically impossible' (2005:60).

In a similar way, Waldby claims that in these shifting understandings of biological processes, a 'temporal homogeneity involving uniform growth,

renewal and ageing' is being replaced by 'a model where time is heterogeneous, with sites of self-renewing vitality interspersed with sites of irreversible loss and degeneration' (2002:316). In carbon, then, as in biotechnical objects that promise to overcome temporal limits to (biological) growth, we encounter a redefined understanding of time, and a burgeoning of multiple and diverse trajectories.

Questions of politics, Grosz argues, are also, ultimately, 'questions of change and of desirable futures' (2004:253). With a detailed attention to politics as the stage where future possibilities are imagined, forged or denied, anthropology can offer a grounded view of lived experiences in the global chronographies (cf. Ferguson 2006) that are developing in the transition to the not-so-common, and not-so-singular, Anthropocenic future(s).

# APPENDIX I

## Key actors in TAMS' organisational structure and their main roles (see also Figure 7, page 68):

**BioCarbon Fund**: The BioCF was created in 2004 as part of the World Bank's Carbon Finance Unit and uses private-public funding to carry out demonstration activities of forest and agro-ecosystem carbon projects. It featured as the carbon buyer in the Emission Reductions Purchasing Agreement (ERPA) in TAMS and provided some of the initial funding.

**Ministry of Environment and Forests** (Ministère des Eaux et Forêts, MEF): The Ministry featured as carbon seller on the ERPA on behalf of the Government of Madagascar, and was posed as the main project owner. Its representation in TAMS went through the *Unité de Coordination des Fonds BioCarbone* (UCFBC), a specifically appointed unit within the Ministry to deal with carbon projects which included two members from the General Office of the Environment (DGE) as part of the General Office of Climate Change (DCC), and two members from the General Office of Forests (DGF).

**Conservation International**: Although CI was usually represented as provider of 'technical support' to the project, its role was pivotal in TAMS, especially at the national level through its offices in Antananarivo.

**ANAE**: *Association Nationale d'Actions Environnementales* became TAMS project manager in 2008 through public tender, and was mainly in charge of coordinating the on-the-ground activities of reforestation and Sustainable Livelihood Activities (SLAs) in Andasibe.

**FAs**: The FAs were local environment/development NGOs and organisations working in Andasibe. In TAMS their task was to carry out reforestation and Sustainable Livelihood Activities (SLAs). Some of them (i.e. Mitsinjo or AGA) had a clearly local character, whereas others, (SAF-FJKM or ANGAP) were national organisations with local or regional offices.

**Local communities**: They were involved in the project as reforestation workers hired by the FAs, and some of them also offered land to the project.

**Louise Holloway**: She was TAMS' original designer and developed the project in the 1990s. She left around 2008, after CI's takeover of the project and ANAE's appointment as project manager.

# APENDIX II

## Brief description of key concepts and elements of a Clean Development Mechanism (CDM) project

**Objectives**: CDM projects have the dual objective of reducing emissions and providing some form of sustainable development.

**Additionality**: As defined by the UNFCCC Report of the COP (2006) in paragraph 43: 'A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity'.

**Baseline**: As defined by the UNFCCC Report of the COP (2006) in paragraph 44: 'The baseline for a CDM project activity is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity'. In TAMS it was based on a mean projection of past trends of deforestation due to *tavy*.

**Permanence and leakage measures**: Permanence refers to the need to make sure reductions remain in place for the established period of the project (30 years in TAMS) and leakage is defined by the UNFCCC Report of the COP (2006) in paragraph 51 as 'the net change of anthropogenic emissions by sources of greenhouse gases which occurs outside the project boundary, and which is measurable and attributable to the CDM project activity'.

**ERPA**: This is the Emissions Reductions Purchasing Agreement, or the carbon sale contract.

**PDD**: This is the Project Design Document, which must contain a full description of the project as well justify the project's additionality, reductions calculations through the baseline and permanence and leakage measures.

# APPENDIX III

**Brief timeline of Madagascar's political history.**

**1787–1810**: Reign of the Merina ruler Andrianampoinimerina.

**1810–28**: Reign of the Merina ruler Radama I (son of Andrianampoinimerina).

**1828–61:** Reign of the isolationist Merina Queen Ranavalona I (the widow of Radama I).

**1861–63:** Reign of the Merina King Radama II.

**1868–83**: Reign of the Merina Queen Ranavalona II.

**1896**: Madagascar is declared a colony of France with General Gallieni as the island's Governor-general.

**June 26, 1960**: Independence is declared.

**1960–72:** First Republic under President Philibert Tsiranana.

**May 14, 1972:** 'The May Revolution'. An uprising in Anatanarivo, initiated by medical students, leads to the end of the First Republic as Tsiranana is forced to resign.

**1972– 1975:** Interregnum under General Gabriel Ramanantsoa.

**1975–91**: Second Republic under Didier Ratsiraka who embarks on a socialist/isolationist project.

**1991–93**: Opposition against Ratsiraka's government leads to a Transitional Period.

**1993:** Third Republic under president Zafy Albert.

**1997**: Didier Ratsiraka is reelected president.

**2002**: The Mayor of Antananarivo Marc Ravalomanana is elected president and Ratsiraka, who does not recognize the result, flees to France.

**2009**: Political unrest builds up in the capital. An anti- government rally in February results in over 50 deaths and the Mayor of

Anatananarivo Andry Rajoelina takes over the government, becoming the president of the High Transition Authority (HAT). Ravalomanana flees to South Africa.

**November 2010**: Rajoelina holds a constitutional referendum and the Fourth Republic is installed.

**2013:** Elections are held in December after a five-year transitional period, and in January 2014 Hery Rajaonarimampianina becomes Madagascar's new President.

# Glossary:

Although every Malagasy term has been translated in the text, I here provide a glossary with the most recurrent or relevant ones.

*Asa maharitra*: work that lasts
*Babakoto*: *Indri-indri* lemur
*Crédits carbone*: carbon credits/money
*Fanjakana*: the state
*Fitaka*: Scam
*Fokontany*: the smallest administrative unit in Madagascar
*Iveloman-tena*: to make oneself living
*Loharano*: water springs
*Mpamatsy vola*: (usually foreign) funder
*Razana*: ancestors
*Savoka*: Fallows and/or secondary vegetation
*Tangalamena*: Village chief
*Tanindrazana*: land of the ancestors
*Tavy*: Slash-and-burn agriculture
*Vazaha*: (usually white) Foreigners
*Voatery*: Being squeezed/oppressed
*Vonivao*: New seed (ritual)
*Zanahary/Andriamanitra*: God
*Zo*: honour or dignity

# REFERENCES

## Archival Documents

**FR ANOM:** Archives Nationales d'Outre-Mer, Aix-en Provence, France

**Fonds Territoriaux:** Madagascar

**GGM** Gouvernment Général de Madagascar 1841-1860

**Série D**: Politique et administration générale 1895/1959

**2 D** - Rapports périodiques des circonscriptions administratives 1896/1940, c. (carton) 1 à 229

**5 D** - Rapports annuels des services 1895/1959

**Fonds Ministeriels**: Deuxieme Empire Colonial

**Ministère des Colonies**

Inspection générale des Travaux publics

Madagascar et Comores

Chemins de fer

Chemins de fer d'intérêt général

Ligne Tananarive-Côte-Est (TCE)

**COL 91 c. 361:**Avant-projet, 1889/1905

## Bibliographic References

Agamben, Giorgio

1999 Potentialities: Collected Essays in Philosophy. Daniel Heller-Roazen, ed. Stanford: Stanford University Press.

Alexander, Catherine
2004 Values, Relations and Changing Bodies: Industrial Privatisation in Kazakhstan. *In* Property in Question: Value Transformation in the Global Economy. Katherine Verdery and Caroline Humphrey, eds. Oxford: Berg.
2005 Value : Economic Valuations and Environmental Policy. *In* A Handbook of Economic Anthropology. 2nd edition. James G Carrier, ed. Cheltenham: Edward Elgar.

Alexander, Catherine, and Joshua Reno
2012 Introduction. *In* Economies of Recycling the Global Transformation of Materials, Values and Social Relations. Catherine Alexander and Joshua Reno, eds. London: Zed Books.

Allen, Philip M, and Maureen Covell
2005 Historical Dictionary of Madagascar: Second Edition. Historical Dictionaries of Africa, 98. Langham: The Scarecrow Press, Inc.

Allerton, Catherine
2012 Visible Relations and Invisible Realms: Speech, Materiality and Two Manggarai Landscapes. *In* Landscapes Beyond Land: Routes, Aesthetics, Narratives. Arnar Árnason, Nicolas Ellison, Jo Vergunst, and Andrew Whitehouse, eds. New York: Berghahn Books.

Almqvist, Ebbe
2003 History of Industrial Gases. New York: Kluwer Academic/Plenum Publishers.

Althabe, Gérard
1969 Oppression et libération dans l'imaginaire, les communautés villageoises le la côte orientale de Madagascar. Paris: F. Maspero.

Anderson, Benedict R.
1991 Imagined Communities: Reflections on the Origin and Spread of Nationalism. London: Verso.

Anderson, Thomas J
2009 Reassembling the Strange Global Science, Race, and the Environment in 19th Century Madagascar. PhD Thesis, University of Michigan.
2013 Solving Madagascar: Science, Illustrations, and the Normalizing of Fauna of Nineteenth Century Madagascar. *In* Contest for Land in Madagascar: Environment, Ancestors, and Development. Sandra Evers, Gwyn Campbell, and Michael Lambek, eds.

Appadurai, Arjun
1986 Commodities and the Politics of Value. *In* The Social Life of Things: Commodities in Cultural Perspective. Arjun Appadurai, ed. Cambridge: Cambridge University Press.
1988 Putting Hierarchy in Its Place. Cultural Anthropology 3: 36–49.

Appel, Hannah
2012 Offshore Work: Oil, Modularity, and the How of Capitalism in Equatorial Guinea. American Ethnologist 39(4): 692–709.
2015 The Idea Life of Money and Poststructural Realism. Hau: Journal of Ethnographic Theory 5(2): 427–433.

Astuti, Rita
1995 People of the Sea: Identity and Descent among the Vezo of Madagascar. Cambridge: Cambridge University Press.

Bakhtin, M. M.
1981 The dialogic imagination: four essays. Michael Holquist, ed. Austin: University of Texas Press.

Bakker, Karen
2005 Neoliberalizing Nature? Market Environmentalism in Water Supply in England and Wales. Annals of the Association of American Geographers 95(3): 542–565.

Bakker, Karen, and Gavin Bridge
2006 Material Worlds? Resource Geographies and the "Matter of Nature." Progress in Human Geography 30(1): 5–27.

Bakker, Karen J
2003 An Uncooperative Commodity: Privatizing Water in England and Wales. Oxford: Oxford University Press.

Bansal, P, and J Knox-Hayes
2013 The Time and Space of Materiality in Organizations and the Natural Environment. Organization and Environment 26(1): 61–82.

Barry, Andrew
2005 Pharmaceutical Matters. Theory, Culture & Society 22(1): 51–69.
2013 Material Politics: Disputes along the Pipeline. Chichester, West Sussex: Wiley-Blackwell.

Barthes, Roland.
1972 Mythologies. New York: Hill and Wang.

BBC, Africa Business Report
N.d. Madagascar's Carbon Credits Plan. http://www.bbc.co.uk/news/business-34219738, accessed November 23, 2015.

Beck, Ulrich
2000 The Brave New World of Work. Cambridge: Polity Press.

Bender, Barbara, and Margot Winer
2001 Contested Landscapes: Movement, Exile and Place. Oxford: Berg.

Benjamin, Alison
2007 Stern: Climate Change a "Market Failure." The Guardian, November 29. http://www.theguardian.com/environment/2007/nov/29/climatechange.carbonemissions, accessed November 15, 2015.

Benjamin, Walter
1968 Thesis on the Philosophy of History. *In* Illuminations. New York: Harcourt, Brace & World.

Bennett, Jane
2010 Vibrant Matter: A Political Ecology of Things. Durham: Duke University Press.

Bennett, Tony, and Patrick Joyce
2010 Introduction. *In* Material Powers: Cultural Studies, History and the Material Turn. Tony Bennett and Patrick Joyce, eds. London: Routledge.

Bidaud, Cecile
2012 Le Carbone Qui Cache La Forêt. La Construction Scientifique et La Mise En Politique Du Service de Stockage Du Carbone Des Forêts Malgaches. PhD Thesis, Graduate Institute of International and Development Studies.

Bigo, Didier
2007 Detention of Foreigners, States of Exception, and the Social Practices of Control of the Banopticon. *In* Borderscapes Hidden Geographies and Politics at Territory's Edge. Prem Kumar Rajaram and Carl Grundy-Warr, eds. Minneapolis: University of Minnesota Press.

BioCarbon Fund
2005 Overview of BioCF ERPA Terms. https://www.wbcarbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=DocLib&CatalogID=25058, accessed January 10, 2015.

2012 BioCarbon Fund Experience: Insights from Afforestation and Reforestation Clean Development Mechanism Projects. Carbon Finance at the World Bank.

Bloch, Maurice
1971 Placing the Dead: Tombs, Ancestral Villages and Kinship Organization in Madagascar. London: Seminar Press Ltd.
1975 Property and the End of Affinity. *In* Marxist Analyses and Social Anthropology. Maurice Bloch, ed. London: Malaby Press.
1977 The Past and the Present in the Present. Man 12: 278–292.
1986 From Blessing to Violence: History and Ideology in the Circumcision Ritual of the Merina of Madagascar. Cambridge: Cambridge University Press.
1995 People into Places: Zafimaniry Concepts of Clarity. *In* The Anthropology of Landscape: Perspectives on Place and Space. Eric Hirsch and Michael O'Hanlon, eds. Oxford: Oxford University Press.

Borges Coutinho, Joana
2010 Sustainable Livelihoods Activities: Local Incentives for Natural Resource Protection in the CRCC/TAMS Area of the Eastern Rainforests. Final Technical Report to Conservation International submitted by MITSINJO.

Born, Georgina
2008 Future Making : Corporate Performativity and the Temporal Politics of Markets. *In* Cultural Politics in a Global Age: Uncertainty, Solidarity and Innovation. David Held, Henrietta L Moore, and Kevin Young, eds. Oxford: Oneworld.

Bowker, Geoffrey C.
2005 Time, Money, and Biodiversity. *In* Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems. Aihwa Ong and Stephen J Collier, eds. Malden, MA: Blackwell Pub.

Boym, Svetlana
2003 Nostalgia and Its Discontents 1. Sociology The Journal Of The British Sociological Association: 7–18.

Bridge, Gavin
2011 Resource Geographies 1: Making Carbon Economies, Old and New. Progress in Human Geography 35(6): 820–834.

Brimont, L, D Ezzine-de-Blas, A Karsenty, and A Toulon
2015 Achieving Conservation and Equity amidst Extreme Poverty and Climate Risk: The Makira REDD+ Project in Madagascar. Forests 6(3): 748–768.

Brockington, Dan, and Katherine Scholfield
2010 The Conservationist Mode of Production and Conservation NGOs in Sub-Saharan Africa. Antipode 42(3): 551–575.

Bumpus, Adam G.
2011 The Matter of Carbon: Understanding the Materiality of tCO2e in Carbon Offsets. Antipode 43(3): 612–638.

Bumpus, Adam G, and Diana M Liverman
2008 Accumulation by Decarbonization and the Governance of Carbon Offsets. Economic Geography 84(2): 127–155.

Burawoy, Michael, and Katherine Verdery
1999 Introduction. *In* Uncertain Transition Ethnographies of Change in the Postsocialist World. Michael Burawoy and Katherine Verdery, eds. Lanham: Rowman & Littlefield.

Burroughs, William S.
1995 Ghost of Chance. New York: High Risk Books.

Büscher, Bram
2010 Derivative Nature: Interrogating the Value of Conservation in "Boundless Southern Africa." Third World Quarterly 31(2): 259–276.

Büscher, Bram, and Jim Igoe
2013 `Prosuming' Conservation? Web 2.0, Nature and the Intensification of Value-Producing Labour in Late Capitalism. Journal of Consumer Culture 13(3): 283–305.

Büscher, Bram, Sian Sullivan, Katja Neves, Jim Igoe, and Dan Brockington
2012 Towards a Synthesized Critique of Neoliberal Biodiversity Conservation. Capitalism Nature Socialism 23(2): 4–30.

Button, Jillian
2008 Carbon Commodity or Currency?: The Case for an International Carbon Market Based on the Currency Model. The Harvard Environmental Law Review 32(2): 571–596.

Calel, Raphael
2011 Climate Change and Carbon Markets: A Panoramic History. Grantham: Grantham Research Institute on Climate Change and the Environment.

Çaliskan, Koray, and Michel Callon

2009 Economization, Part 1: Shifting Attention from the Economy towards Processes of Economization. Economy and Society 38(3): 369–398.
2010 Economization, Part 2: A Research Programme for the Study of Markets. Economy and Society 39(1): 1–32.

Callon, Michel
1998a The Laws of the Markets. Oxford; Malden, MA: Blackwell Publishers/Sociological Review.
1998b An Essay on Framing and Overflowing: Economic Externalities Revisited by Sociology. The Sociological Review 46(S1): 244–269.
1998c The Embeddedness of Economic Markets in Economics. *In* The Laws of the Markets. Callon, Michel, ed. Oxford: Blackwell Publishers.
2007 What Does It Mean to Say That Economics Is Performative? *In* Do Economists Make Markets?: On the Performativity of Economics. Donald A. MacKenzie, Fabian Muniesa, and Lucia Siu, eds. Princeton: Princeton University Press.

Callon, Michel, Yuval Millo, and Fabian Muniesa
2007 An Introduction to Market Devices. *In* Market Devices. Michel Callon, Yuval Millo, and Fabian Muniesa, eds. Malden, MA: Blackwell Publishers.

Callon, Michel, and Fabian Muniesa
2003 Les marchés économiques comme dispositifs collectifs de calcul. Reseaux 21(122): 189–233.

Campbell, Gwyn
2013 Forest Depletion in Imperial Madgascar, c.1790-1861. *In* Contest for Land in Madagascar: Environment, Ancestors, and Development. Sandra Evers, Gwyn Campbell, and Michael Lambek, eds.

Castree, Noel
2003 Commodifying What Nature? Progress in Human Geography 27(3): 273–297.
2014 The Anthropocene and Geography I: The Back Story. Geography Compass 8(7): 436–449.

CDM, UNFCCC
N.d. CDM: Ankeniheny-Zahamena-Mantadia Biodiversity Conservation Corridor and Restoration Project (Reforestation Component). http://cdm.unfccc.int/Projects/Validation/DB/7COYHD5A226DPJ9MMFBP9CGGTSAWSA/view.html, accessed November 23, 2015.

Chenost, Clément, Yves-Marie Gardette, Julien Demenois, et al.
2010 Les Marchés Du Carbone forestier/Bringing Forest Carbon Projects to the Market. ONF International.

http://www.onfinternational.org/images/pdf/Guide_marches_carbone_forestier.pdf.

Coase, R. H
1960 The Problem of Social Cost. Journal of Law and Economics 3: 1–44.

Cole, Jennifer
1997 Sacrifice, Narratives and Experience in East Madagascar. Journal of Religion in Africa 27: 401–425.
2001 Forget Colonialism? Sacrifice and the Art of Memory in Madagascar. Berkeley: University of California Press.
2010 Sex and Salvation: Imagining the Future in Madagascar. Chicago: University of Chicago Press.

Cole, Jennifer, and Karen Middleton
2001 Rethinking ancestors and colonial power in Madagascar. Africa. 71: 1–37.

Collectif pour la Défense des Terres Malgaches - TANY
2015 La Politique Fonciere, C'est l'Affaire de Tous Les Citoyens.

Conservation International
N.d. CELB 2012. http://www.conservation.org/publications/Documents/2012_CELB_Brochure.pdf, accessed November 13, 2015.

Cooper, Mark H
2015 Measure for Measure? Commensuration, Commodification, and Metrology in Emissions Markets and beyond. Environment and Planning A.

Cooper, Melinda
2006 Resuscitations: Stem Cells and the Crisis of Old Age. Body & Society 12(1): 1–23.
2008 Life as Surplus Biotechnology and Capitalism in the Neoliberal Era. Seattle: University of Washington Press.

Coronil, Fernando
1997 The Magical State: Nature, Money, and Modernity in Venezuela. Chicago: University of Chicago Press.

Corson, Catherine
2010 Shifting Environmental Governance in a Neoliberal World: US AID for Conservation. Antipode 42(3): 576–602.

Cronon, William.
1995 The Trouble with Wilderness; Or, Getting back to the Wrong Nature.

*In* Uncommon Ground: Toward Reinventing Nature. William. Cronon, ed. New York: W.W. Norton & Co.

Davidov, Veronica
2014 Land, Copper, Flora: Dominant Materialities and the Making of Ecuadorian Resource Environments. Anthropological Quarterly 87(1): 31–58.

Day, Sophie, Evthymios Papataxiarchēs, and Michael Stewart, eds.
1999 Lilies of the Field: Marginal People Who Live for the Moment. Boulder: Westview Press.

De Landa, Manuel
2002 Intensive Science and Virtual Philosophy. London: Continuum.

Deleuze, Gilles, and Félix Guattari
1987 A Thousand Plateaus: Capitalism and Schizophrenia. Minneapolis: University of Minnesota Press.

Descola, Philippe, and Gísli Pálsson, eds.
1996 Nature and Society: Anthropological Perspectives. London: Routledge.

Dewar, Bob, Simon Massey, Bruce Baker, and Royal Institute of International Affairs
2013 Madagascar Time to Make a Fresh Start. London: Chatham House. http://www.chathamhouse.org/sites/default/files/public/Research/Africa/0113pp_madagascar.pdf, accessed October 14, 2015.

Dewar, R, Radimilahy C, Wright HT, et al.
2013 Stone Tools and Foraging in Northern Madagascar Challenge Holocene Extinction Models. Proceedings of the National Academy of Sciences of the United States of America 110(31): 12583–8.

Dodd, Nigel
2014 The Social Life of Money. Princeton, N.J.: Princeton University Press.

Dolch, Rainer, Tina Vahanen, François Busson, Christopher Holmes, and Hantaniaina Rabesandratana
2009 REDD Madagascar Interview. Madagascar Conservation and Development 4(2).

Douglas, Mary
1966 Purity and Danger; an Analysis of Concepts of Pollution and Taboo. New York: Praeger.

Duffy, Rosaleen
2006 Non-Governmental Organisations and Governance States: The Impact of Transnational Environmental Management Networks in Madagascar. Environmental Politics 15(5): 731–749.

Evers, Sandra
2002 Constructing History, Culture and Inequality: The Betsileo in the Extreme Southern Highlands of Madagascar. Leiden; Boston: Brill.

Evers, Sandra, Marja Spierenburg, and Harry Wels
2005 Introduction - Competing Jurisdictions: Settling Land Claims in Africa, Including Madagascar. *In* Competing Jurisdictions: Settling Land Claims in Africa. Sandra Evers, Marja Spierenburg, and Harry Wels, eds. Leiden; Boston: Brill.

Fabian, Johannes
1983 Time and the Other: How Anthropology Makes Its Object. New York: Columbia University Press.

Feeley-Harnik, Gillian
1991 A Green Estate: Restoring Independence in Madagascar. Washington, D.C.: Smithsonian Institution Press.

Felli, Romain
2014 On Climate Rent. Historical Materialism 22(3-4): 251–280.

Ferguson, Barry
2009 REDD Comes into Fashion in Madagascar. Madagascar Conservation & Development 4(2).

Ferguson, James
1999 Expectations of Modernity: Myths and Meanings of Urban Life on the Zambian Copperbelt. Berkeley: University of California Press.
2006 Global Shadows: Africa in the Neoliberal World Order. Durham [N.C.]: Duke University Press.
2010 The Uses of Neoliberalism. Antipode 41(Supplement): 166–184.

Ferry, Elizabeth E.
2008 Rocks of Ages: Temporal Trajectories of Mexican Mined Substances. *In* Timely Assets: The Politics of Resources and Their Temporalities. Elizabeth E. Ferry and Mandana E. Limbert, eds. Santa Fe: School for Advanced Research Press.
2011 Waste and Potency: Making Men with Minerals in Guanajuato and Tucson. Comparative Studies in Society and History 53(04): 914–944.

Ferry, Elizabeth E., and Mandana E. Limbert
2008 Introduction. *In* Timely Assets: The Politics of Resources and Their Temporalities. Elizabeth E. Ferry and Mandana E. Limbert, eds. Santa Fe: School for Advanced Research Press.

Flynn, Alex
2008 The Mechanics of Legitimation: An Aristotelian Perspective on Environmental Narratives. Conservat Soc 6: 308–19.

Foster, John Bellamy
2002 Ecology against Capitalism. New York: Monthly Review Press.

Foucault, Michel
1977 Discipline and Punish: The Birth of the Prison. New York: Pantheon Books.

Fox, James
2006 Place and Landscape in Comparative Austronesian Perspective. *In* Poetic Power of Place Comparative Perspectives on Austronesian Ideas of Locality. James Fox, ed. Canberra: ANU E Press.

Franklin, Sarah
2003 Re-Thinking Nature-Culture: Anthropology and the New Genetics. Anthropological Theory 3(1): 65–85.
2005 Stem Cells R Us : Emergent Life Forms and the Global Biological. *In* Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems. Aihwa Ong and Stephen J Collier, eds. Malden, MA: Blackwell Publishers.

Frow, John
1997 Time and Commodity Culture: Essays in Cultural Theory and Postmodernity. Oxford: Clarendon Press.

Garland, Elizabeth.
2008 The Elephant in the Room Confronting the Colonial Character of Wildlife Conservation in Africa. African Studies Review 51(3): 51–74.

Gezon, Lisa L
2006 Global Visions, Local Landscapes: A Political Ecology of Conservation, Conflict, and Control in Northern Madagascar. Lanham, MD: AltaMira Press.

Global Invasive Species Database
2014 Psidium Cattleianum. Global Invasive Species Database. http://www.issg.org/database/species/ecology.asp?si=59, accessed November 14, 2014.

Goldman, Michael
2001 The Birth of a Discipline: Producing Authoritative Green Knowledge, World Bank-Style. Ethnography 2(2): 191–217.

Goody, Jack
1971 Technology, Tradition, and the State in Africa. London: Oxford University Press.

Gow, Bonar A.
1997 Admiral Didier Ratsiraka and the Malagasy Socialist Revolution. Journal of Modern African Studies 35(3): 409–439.

Graeber, David
2007 Lost People Magic and the Legacy of Slavery in Madagascar. Bloomington: Indiana University Press.
2011 Debt: The First 5,000 Years. Brooklyn, N.Y.: Melville House.

Grant, Bruce
2001 New Moscow Monuments, Or, States of Innocence. American Ethnologist 28(2): 332–362.

Greenhouse, Carol J.
1989 Just in Time: Temporality and the Cultural Legitimation of Law. The Yale Law Journal 98(8): 1631–1651.

Grosz, E. A
2004 The Nick of Time: Politics, Evolution, and the Untimely. Durham: Duke University Press.

Gupta, Akhil, and James Ferguson
1997 Discipline and Practice: "The Field" as Site, Method, and Location in Anthropology. *In* Anthropological Locations: Boundaries and Grounds of a Field Science. Akhil Gupta and James Ferguson, eds. Berkeley: University of California Press.

Guyer, Jane I.
2007 Prophecy and the near Future: Thoughts on Macroeconomic, Evangelical, and Punctuated Time. American Ethnologist 34: 409–421.

Hann, Chris
1998 Introduction: The Embeddedness of Property. *In* Property Relations : Renewing the Anthropological Tradition. Chris Hann, ed. Cambridge: Cambridge University Press.

Haraway, Donna

1988 Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. Feminist Studies 14(3): 575–599.
1997 ModestWitness@Second_Millennium. FemaleMan_Meets_OncoMouse: Feminism and Technoscience. New York: Routledge.

Hardin, Garrett
1968 The Tragedy of the Commons. Science, New Series 162(3859).

Harper, Janice
2002 Endangered Species: Health, Illness, and Death among Madagascar's People of the Forest. Durham, N.C.: Carolina Academic Press.

Harrison, Graham
2004 The World Bank and Africa: The Construction of Governance States. London: Routledge.

Harvey, David
1974 Population, Resources, and the Ideology of Science. Economic Geography 50(3): 256–277.
1982 The Limits to Capital. Chicago: University of Chicago Press.
1990 The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change. Oxford: Blackwell.
2001 Globalization and the "Spatial Fix." Geographische Revue 2: Geographische Revue.

Harvey, Penny
2013 Anthropological Approaches to Contemporary Material Worlds. *In* The Oxford Handbook of the Archaeology of the Contemporary World. Paul Graves-Brown and Rodney Harrison, eds. Oxford Handbooks Online. http://oxfordindex.oup.com/view/10.1093/oxfordhb/9780199602001.013.006.

Hawkins, Gay., and Stephen Muecke
2003 Introduction: Cultural Economies of Waste. *In* Culture and Waste: The Creation and Destruction of Value. Gay. Hawkins and Stephen Muecke, eds. Lanham, Md.: Rowman & LIttlefield.

Hayden, Cori
2003 When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico. Princeton: Princeton University Press.
2012 Rethinking Reductionism, Or, the Transformative Work of Making the Same. Anthropological Forum 22(3): 271–283.

Hecht, Gabrielle

2012 Being Nuclear: Africans and the Global Uranium Trade. Cambridge, Mass.: MIT Press.

Helmreich, Stefan
2005 How Scientists Think; About "Natives", For Example. A Problem of Taxonomy among Biologists of Alien Species in Hawaii. Journal of the Royal Anthropological Institute 11(1): 107–128.

High Level Panel on the CDM Policy Dialogue
2012 Climate Change, Carbon Markets and the CDM: A Call to Action. http://www.cdmpolicydialogue.org/report/rpt110912.pdf.

Hobsbawm, E. J., and T. O. Ranger
1983 The Invention of Tradition. Cambridge: Cambridge University Press.

Hufty, Marc, and Frank Muttenzer
2002 Devoted Friends: The Implementation of the Convention on Biological Diversity in Madagascar. *In* Governing Global Biodiversity. Philippe Le Prestre, ed. London: Ashgate.

Hughes, David McDermott
2005 Third Nature: Making Space and Time in the Great Limpopo Conservation Area. Cultural Anthropology 20(2): 157–184.

Igoe, Jim
2010 The Spectacle of Nature in the Global Economy of Appearances: Anthropological Engagements with the Spectacular Mediations of Transnational Conservation. Critique of Anthropology 30(4): 375–397.

Ingold, Tim
1993 The Temporality of the Landscape. World Archaeology 25(2): 152–174.
2000 The Perception of the Environment: Essays on Livelihood, Dwelling and Skill. London: Routledge.

IUCN Red List of Threatened Species
2014 Indri Indri. IUCN Red List of Threatened Species. http://www.iucnredlist.org/details/10826/0, accessed November 14, 2014.

Jarosz, Lucy
1996 Defining Deforestation in Madagascar. *In* Liberation Ecologies : Environment, Development, Social Movements. Richard Peet and Michael Watts, eds. Pp. 148–164. London: Routledge.

Jessop, Bob

2006 Spatial Fixes, Temporal Fixes and Spatio-Temporal Fixes. *In* David Harvey: A Critical Reader. Noel Castree and Derek Gregory, eds. Malden, MA: Blackwell Pub.

Katz, Cindi
1998 Whose Nature, Whose Culture?: Private Productions of Space and the "Preservation" of Nature. *In* Remaking Reality Nature at the Millenium. Bruce Braun and Noel Castree, eds. London: Routledge.

Kay, Lily E
1993 The Molecular Vision of Life Caltech, the Rockefeller Foundation, and the Rise of the New Biology. New York: Oxford University Press.

Keller, Eva
2008 The Banana Plant and the Moon: Conservation and the Malagasy Ethos of Life Masoala, Madagascar. American Ethnologist 35: 650–664.
2015 Beyond the Lens of Conservation: Malagasy and Swiss Imaginations of One Another. New York: Berghahn Books.

Knox-Hayes, Janelle
2010 Constructing Carbon Market Spacetime: Climate Change and the Onset of Neo-Modernity. Annals of the Association of American Geographers 100(4): 953–962.
2013 The Spatial and Temporal Dynamics of Value in Financialization: Analysis of the Infrastructure of Carbon Markets. Geoforum 50(1): 117–128.

Knox-Hayes, Janelle, and Jennifer Clark
2011 An Emerging Geography of Intangible Assets: Financialization in Carbon Emissions Credit and Intellectual Property Markets. Georgia Institute of Technology.

Knudsen, Ståle
2014 Multiple Sea Snails: The Uncertain Becoming of an Alien Species. Anthropological Quarterly 87(1): 59–92.

Kopytoff, Igor
1986 Cultural Biography of Things : Commoditization as Process. *In* The Social Life of Things: Commodities in Cultural Perspective. Arjun Appadurai, ed. Cambridge: Cambridge University Press.

Kull, Christian A.
1996 The Evolution of Conservation Efforts in Madagascar. International Environmental Affairs 8(1): 50–86.
2002 Empowering Pyromaniacs in Madagascar: Ideology and Legitimacy in Community-Based Natural Resource Management. Development and Change. 331(1): 57–78.

2004 Isle of Fire: The Political Ecology of Landscape Burning in Madagascar. Chicago: University of Chicago Press.

Lang, Chris
N.d. The Case of the Missing Carbon Credits. REDD-Monitor. http://www.redd-monitor.org/2011/01/25/the-case-of-the-missing-carbon-credits/, accessed November 14, 2015.

Lansing, David M
2011 Realizing Carbon's Value: Discourse and Calculation in the Production of Carbon Forestry Offsets in Costa Rica. Antipode 43(3): 731–753.

Latour, Bruno
1993 We Have Never Been Modern. Cambridge, Mass.: Harvard University Press.
1996 Aramis, or, The love of technology. Cambridge, Mass.: Harvard University Press.

Law, John
2002 Aircraft Stories: Decentering the Object in Technoscience. Durham, NC: Duke University Press.

Law, John, and Annemarie Mol
1998 On Metrics and Fluids. *In* Organized Worlds: Explorations in Technology and Organization with Robert Cooper. Robert C. H Chia, ed. London: Routledge.
2002a Complexities: Social Studies of Knowledge Practices. Durham: Duke University Press.
2002b Introduction. *In* Complexities: Social Studies of Knowledge Practices. John Law and Annemarie Mol, eds. Durham: Duke University Press.

Leach, Melissa, James Fairhead, and James Fraser
2012 Green Grabs and Biochar Revaluing African Soils and Farming in the New Carbon Economy. Journal of Peasant Studies 39(2): 285–307.

Leach, Melissa, and Ian Scoones, eds.
2015 Carbon Conflicts and Forest Landscapes in Africa. London: Routledge.

Leach, Melissa, and Thomas Winnebah
2015 Old Reserve-New Carbon Interests: The Case of the Western Area Peninsular Forest (WAPFor), Sierra Leone. *In* Carbon Conflicts and Forest Landscapes in Africa. Melissa Leach and Ian Scoones, eds. London: Routledge.

Lecocq, Franck, and Philippe Ambrosi
2007 Policy MonitorEdited by Maureen CropperThe Clean Development Mechanism: History, Status, and Prospects. Review of Environmental Economics and Policy 1(1): 134–151.

Lefebvre, Henri
1991 The production of space. Oxford: Blackwell.

Lekan, Thomas M.
2014 Fractal Eaarth: Visualizing the Global Environment in the Anthropocene. Environmental Humanities 5: 171–201.

Lien, Marianne E.
2007 Weeding Tasmanian Bush : Biomigration and Landscape Imagery. *In* Holding Worlds Together: Ethnographies of Knowing and Belonging. Marianne E. Lien and Marit. Melhuus, eds. New York: Berghahn Books.

Lien, Marianne Elizabeth, and John Law
2011 "Emergent Aliens": On Salmon, Nature, and Their Enactment. Ethnos 76(1): 65–87.

Li, Tania Murray
2005 Beyond "the State" and Failed Schemes. American Anthropologist 107(3): 383–394.

Lohmann, Larry
2005 Marketing and Making Carbon Dumps: Commodification, Calculation and Counterfactuals in Climate Change Mitigation. Science as Culture 14(3): 203–235.
2006 Carbon Trading: A Critical Conversation on Climate Change, Privatisation and Power. Development Dialogue, 48. Uppsala, Sweden: Dag Hammarskjöld Foundation.
2009 Toward a Different Debate in Environmental Accounting: The Cases of Carbon and Cost-Benefit. Accounting, Organizations and Society 34(3): 499–534.
2010 Uncertainty Markets and Carbon Markets: Variations on Polanyian Themes. New Political Economy 15(2): 225–254.
2014 Performative Equations and Neoliberal Commodification : The Case of Climate. *In* Nature Inc.: Environmental Conservation in the Neoliberal Age. Bram Büscher, Wolfram Heinz Dressler, and Robert Fletcher, eds.

Louvel, M.
1909 La Forét d'Analamazaotra. Bulletin Economique de Madagascar 2(6).

Lukács, György

1971 History and Class Consciousness: Studies in Marxist Dialectics. Cambridge, Mass.: MIT Press.

MacKenzie, Donald A
2006 An Engine, Not a Camera How Financial Models Shape Markets. Cambridge, Mass.: MIT Press.

MacKenzie, Donald A, Fabian Muniesa, and Lucia Siu
2007 Do Economists Make Markets?: On the Performativity of Economics. Princeton: Princeton University Press.

Maine, Henry Sumner
1905 Ancient Law: Its Connection with the Early History of Society and Its Relations to Modern Ideas. London: Murray.

Mangalaza, Eugène Régis
1998 Vie et mort chez les Betsimisaraka de Madagascar: essai d'anthropologie philosophique. Paris: L'Harmattan.

Marcus, George E
1995 Ethnography In/of the World System: The Emergence of Multi Sited Ethnography. Annual Review of Anthropology 24: 95–117.

Marcus, George, and Erkan Saka
2006 Assemblage. Theory, Culture & Society 23(2-3): 2–3.

Maurer, Bill
2002 Repressed Futures: Financial Derivatives' Theological Unconscious. Economy and Society 31(1): 15–36.

McAfee, Kathleen
1999 Selling nature to save it? Biodiversity and green developmentalism. Environment and planning D : society and space 17(2).
2003 Neoliberalism on the Molecular Scale. Economic and Genetic Reductionism in Biotechnology Battles. Geoforum 34(2): 203–219.

McCarthy, James J, and Scott Prudham
2004 Neoliberal Nature and the Nature of Neoliberalism. Geoforum 35(3): 275–283.

McConnell, William J
2002 Misconstrued Land Use in Vohibazaha: Participatory Planning in the Periphery of Madagascar's Mantadia National Park. Jounral of Land Use Policy 19(3): 217–230.

Meadows, Donella H, and Club of Rome

1972 The Limits to Growth; a Report for the Club of Rome's Project on the Predicament of Mankind. New York: Universe Books.

Meadows, Donella H, Dennis L Meadows, and Jørgen Randers
1992 Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future. Post Mills, Vt.: Chelsea Green.

Methmann, Chris
2013 The Sky Is the Limit: Global Warming as Global Governmentality. European Journal of International Relations 19(1).

Michael, Wambi
N.d. Q&A: Why Kyoto's Clean Development Mechanism Is at a Crossroads | Inter Press Service. 4/12/2014. Inter Press Service. http://www.ipsnews.net/2014/12/qa-why-kyotos-clean-development-mechanism-is-at-a-crossroads/, accessed November 15, 2015.

Middleton, Karen
1999 Ancestors, Power, and History in Madagascar. Leiden; Boston: Brill.

Miller, Daniel
2005 Materiality: An Introduction. *In* Materiality. Daniel Miller, ed. Durham, N.C.: Duke University Press.

Mitchell, Timothy
2002 Rule of Experts Egypt, Techno-Politics, Modernity. Berkeley: University of California Press.
2008 Rethinking Economy. Geoforum 39(3): 1116–1121.
2011 Carbon Democracy: Political Power in the Age of Oil. London: Verso.

Mittermeier, Russel A.
2014 Is There New Hope for Madagascar? Human Nature – Conservation International Blog. http://blog.conservation.org/2014/03/is-there-new-hope-for-madagascar/, accessed November 15, 2015.

Miyazaki, Hirokazu
2005 The Materiality of Finance Theory. *In* Materiality. Daniel Miller, ed. Durham, N.C.: Duke University Press.

Mol, Annemarie
2002a The Body Multiple: Ontology in Medical Practice. Durham: Duke University Press.
2002b Cutting Surgeons, Walking Patients. *In* Complexities: Social Studies of Knowledge Practices. John Law and Annemarie Mol, eds. Durham: Duke University Press.

Moser, Walter
2002 The Acculturation of Waste. *In* Waste-Site Stories the Recycling of Memory. Brian Neville and Johanne Villeneuve, eds. Albany: State University of New York Press.

Munn, Nancy D
1992 The Cultural Anthropology of Time: A Critical Essay. Annual Review of Anthropology 21: 93–123.

Muttenzer, Frank
2006 The Folk Conceptualization of Property and Forest-Related Going Concerns in Madagascar. *In* Changing Properties of Property. Franz von Benda-Beckmann, Keebet von Benda-Beckmann, and Melanie Wiber, eds. New York: Berghahn Books.
2010 Politiques Foncières et Pluralisme Juridique à Madagascar: La Reconnaissance de La Tenure Coutumière Dans L'impasse Légale. Taloha 19.

Myers, Norman
1988 Threatened Biotas: "Hot Spots" in Tropical Forests. Environmentalist 8(3): 187–208.

Newell, Peter, Max Boykoff, and Emily Boyd
2012 The New Carbon Economy Constitution, Governance and Contestation. Chicester: John Wiley & Sons.

O'Connor, James
1998 Natural Causes: Essays in Ecological Marxism. New York: Guilford Press.

Ong, Aihwa, and Stephen J Collier
2005 Global Assemblages, Anthropological Problems. *In* Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems. Aihwa Ong and Stephen J Collier, eds. Malden, MA: Blackwell Pub.

Onneweer, Maarten
2014 Rumors of Red Mercury: Histories of Materiality and Sociality in the Resources of Kitui, Kenya. Anthropological Quarterly 87(1): 93–118.

Parry, Jonathan P, and Maurice Bloch
1989 Money and the Morality of Exchange. Cambridge: Cambridge University Press.

Perlman, Janice E

1976 The Myth of Marginality: Urban Poverty and Politics in Rio de Janeiro. Berkeley: University of California Press.
2005 The Myth of Marginality Revisited: The Case of Favelas in Rio de Janeiro, 1969-2003. World Bank. http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1269364699096/6892630-1269364758309/perlman.pdf, accessed October 25, 2015.

Polanyi, Karl
1957 The Great Transformation. Boston: Beacon Press.

Pollini, Jacques
2007 Slash-and-Burn Cultivation and Deforestation in the Malagasy Rain Forests:representations and Realities. PhD Thesis, Cornell University.

Powells, G. D.
2009 Complexity, Entanglement, and Overflow in the New Carbon Economy: The Case of the UK's Energy Efficiency Commitment. Environment and Planning A 41(10): 2342–2356.

Prudham, Scott
2007 The Fictions of Autonomous Invention: Accumulation by Dispossession, Commodification and Life Patents in Canada. Antipode 39(3): 406–429.

Rabinow, Paul
2003 Anthropos Today Reflections on Modern Equipment. Princeton, N.J.: Princeton University Press.

Raik, D
2007 Forest Management in Madagascar: An Historical Overview. Madagascar Conservation & Development 2(1). http://www.ajol.info/index.php/mcd/article/view/44123, accessed October 14, 2015.

Rakotondrazafy, Herizo Hasina
2007 Étude de La Governance Des Aires Proteges de Madagascar: Cas Du Parc National Andasibe Mantadia et Du Lac Alaotra. Memoire fin d'etudes, Université d'Antananarivo.

Ramanantsoavina, Georges
1973 Note Sur La Politique et l'Administration Forestieres a Madagascar. Ministere Du Developppement Rural, Direction Des Eaux et Forêts et de La Conservation Des Sols. Tananarive: Repoblika Malagasy.

Ramaswamy, Sumathi.

2004 The Lost Land of Lemuria Fabulous Geographies, Catastrophic Histories. Berkeley: University of California Press.

Razanamapisa, Samuel
N.d. Historique et évolution Des Chemin de Fer Malagasy. Biblioteque Nationale.

Reno, Joshua
2011 Motivated Markets: Instruments and Ideologies of Clean Energy in the United Kingdom. Cultural Anthropology 26(3): 389–413.

Repoblika Malagasy,
1974a Plan de Developpement National 1974-1977. Antananarivo: Ministere du Plan.
1974b Discours-Programme, Prononce Par Le General de Division Gabriel Ramanantsoa, Chef Du Gouvernement, Le 27 Juillet 1972. Plan de Developpement National. Tananarive: Ministere Du Plan: v–xvii.

Revue de Madagascar
1904 Inauguration Du Chemin de Fer de Tananarive a La Mer. Revue de Madagascar 11(1): 509–559.

Richardson, Tanya
2014 The Politics of Multiplication in a Failed Soviet Irrigation Project, Or, How Sasyk Has Been Kept from the Sea. Ethnos: Journal of Anthropology: 1–27.

Richardson, Tanya, and Gisa Weszkalnys
2014 Resource Materialities. Anthropological Quarterly 87(1): 5–30.

Riles, Annelise
2000 The Network inside out. Ann Arbor: University of Michigan Press.

Ritzer, George, and Nathan Jurgenson
2010 Production, Consumption, Prosumption. Journal of Consumer Culture 10(1): 13–36.

Robertson, Morgan M
2000 No Net Loss: Wetland Restoration and the Incomplete Capitalization of Nature. Antipode 32(4): 463–493.

Roe, E. M.
2005 Development narratives, or making the best of blueprint development. Blackwell anthologies in social and cultural anthropology 6: 313.

Rose, Nikolas
1999 Powers of Freedom Reframing Political Thought. Cambridge: Cambridge University Press.
2001 The Politics of Life Itself. Theory, Culture and Society 18(6): 1–30.

Rotman, B
1987 Signifying Nothing: The Semiotics of Zero. New York: St. Martin's Press.

Sahlins, Marshall
1972 Stone Age Economics. Chicago: Aldine-Atherton.

Sandmo, A
2015 The Early History of Environmental Economics. Review of Environmmental Economics and Policy 9(1): 43–63.

Scanlan, John
2005 On Garbage. London: Reaktion.

Scott, James C
1985 Weapons of the Weak Everyday Forms of Peasant Resistance. New Haven: Yale University Press.
1998 Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed. New Haven: Yale University Press.
2009 The Art of Not Being Governed an Anarchist History of Upland Southeast Asia. New Haven: Yale University Press.

Slater, Don
2002 From Calculation to Alienation: Disentangling Economic Abstractions. Economy and Society 31(2): 234–249.

Smith, Neil
1990 Uneven Development: Nature, Capital, and the Production of Space. New York, NY: Blackwell.

Sodikoff, Genese Marie
2004 Land and Languor: Ethical Imaginations of Work and Forest in Northeast Madagascar. History and Anthropology 15(4): 367–398.
2005 Reserve Labor a Moral Ecology of Conservation in Madagascar. PhD Thesis, University of Michigan.
2009 The Low-Wage Conservationist: Biodiversity and Perversities of Value in Madagascar. American Anthropologist 111(4): 443–455.
2012a Forest and Labor in Madagascar: From Colonial Concession to Global Biosphere. Bloomington: Indiana University Press.

2012bForest and Labor in Madagascar. From Colonial Concession to Global Biosphere. Indiana University Press.
2013 The Time of Living Dead Species : Extinction Debt and Futurity in Madagascar. *In* Debt: Ethics, the Environment, and the Economy. Peter Yoonsuk. Paik and Merry E. Wiesner, eds. Bloomington: Indiana University Press.

Solomon, Barry D., and Hugh S. Gorman
2002 The Origins, Practice, and Limits of Emissions Trading. Journal of Policy History 14(3): 293–320.

Strathern, Marilyn
1980 No Nature, No Culture: The Hagen Case. *In* Nature, Culture and Gender. Carol P. MacCormak and Marilyn Strathern, eds. Pp. 174–222. Cambridge: Cambridge University Press.
1991 Partial Connections. Savage, Md.: Rowman & Littlefield Publishers.
1992 After Nature: English Kinship in the Late Twentieth Century. Cambridge: Cambridge University Press.

Sullivan, Sian
2013 Banking Nature? The Spectacular Financialisation of Environmental Conservation. Antipode 45(1): 198–217.

Swanson, Heather Anne, Nils Bubandt, and Anna Lowenhaupt Tsing
2015 Less Than One But More Than Many: Anthropocene as Science Fiction and Scholarship-in-the-Making. Environment and Society: Advances in Research 6(1): 149–166.

Takacs, David
2009 Forest Carbon: Law and Property Rights. Conservation International. http://ssrn.com/abstract=1661334, accessed November 1, 2015.

Taussig, Michael
2003 Miasma. *In* Culture and Waste: The Creation and Destruction of Value. Gay Hawkins and Stephen Muecke, eds. Lanham, Md.: Rowman & LIttlefield.

The Forest Carbon Partnership Facility
N.d. Home. https://www.forestcarbonpartnership.org/, accessed November 13, 2015.

The Nature Conservancy, Conservation International, and Wildlife Conservation Society
2010 Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience. Arlington, Virginia.

Thomas, Nicholas
1991 Entangled Objects: Exchange, Material Culture, and Colonialism in the Pacific. Cambridge, Mass.: Harvard University Press.

Thomas, Philip
2006 The Water That Blesses, The River That Flows: Place And The Ritual Imagination Among The Temanambondro Of Southeast Madagascar. *In* Poetic Power of Place Comparative Perspectives on Austronesian Ideas of Locality. James J Fox, ed. Canberra: ANU E Press.

Thompson, M
1979 Rubbish Theory: The Creation and Destruction of Value. Oxford: Oxford University Press.

Tsing, Anna Lowenhaupt
1995 Empowering Nature, or: Some Gleanings in Bee Culture. *In* Naturalizing Power: Essays in Feminist Cultural Analysis. Sylvia Junko Yanagisako and Carol Lowery Delaney, eds. New York: Routledge.
2005 Friction: An Ethnography of Global Connection. Princeton, N.J.: Princeton University Press.
2012 Contaminated Diversity in "Slow Disturbance": Potential Collaborators for a Liveable Earth. *In* Why Do We Value Diversity?: Biocultural Diversity in a Global Context. Gary Martin, Diana Mincyte, and Ursula Münster, eds. , 95-97. Munich: Rachel Carson Center for Environment and Society.

UNFCCC
1992 United Nations Framework Convention on Climate Change. Bonn, Germany: UNFCCC.
2006 Report of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol on Its First Session, Held at Montreal from 28 November to 10 December 2005. http://unfccc.int/resource/docs/2005/cmp1/eng/08a01.pdf.
2010 The Kyoto Protocol Mechanisms. http://cdm.unfccc.int/about/cdm_kpm.pdf, accessed February 19, 2015.

UNFCCC-CDM
N.d. Designated National Authority. https://cdm.unfccc.int/DNA/index.html, accessed November 13, 2015.

USAID
2010 USAID Country Profile: Property Rights and Resource Governance - Madagascar. http://www.usaidlandtenure.net/sites/default/files/country-profiles/full-reports/USAID_Land_Tenure_Madagascar_Profile.pdf.

Van der Werf, G. R., D. C. Morton, R. S. DeFries, et al.
2009 CO2 Emissions from Forest Loss. Nature Geoscience 2(11): 737–738.

Verdery, Katherine
1996 What Was Socialism, and What Comes Next? Princeton, N.J.: Princeton University Press.
1999 Fuzzy Property : Rights, Power, and Identity in Transylvania's Decollectivization. *In* Uncertain Transition Ethnographies of Change in the Postsocialist World. Michael Burawoy and Katherine Verdery, eds. Lanham: Rowman & Littlefield.

Veteto, James R, and Joshua Lockyer
2008 Environmental Anthropology Engaging Permaculture: Moving Theory and Practice Toward Sustainability. Culture & Agriculture 30(1-2): 47–58.

Waldby, Catherine
2002 Stem Cells, Tissue Cultures and the Production of Biovalue. Health: 6(3): 305–323.

Waldby, Cathy, and Robert Mitchell
2006 Tissue Economies: Blood, Organs, and Cell Lines in Late Capitalism. Durham [N.C.]: Duke University Press.

Walsh, Andrew
2012 Made in Madagascar: Sapphires, Ecotourism, and the Global Bazaar. Toronto: University of Toronto Press.

WCDE, World Commission on Environment and Development
1987 Our Common Future. Oxford: Oxford University Press.

WCS
2013 Madagascar Puts First-Ever Government-Backed Carbon Credits on Open Market. WCS News Releases. http://newsroom.wcs.org/NewsReleases/tabid/13614/articleType/ArticleView/articleId/5253/Madagascar-Puts-First-Ever-Government-Backed-Carbon-Credits-on-Open-Market.aspx, accessed November 15, 2015.

Weber, Max
1958 The Protestant Ethic and the Spirit of Capitalism. New York: Scribner.

Wemaëre, Matthieu, and Guy Rajaonson
2006 Note Sur La Nature Juridique Du Carbone et Les Droits de Propriété Sur Les Crédits Carbone. Proposition Pour La Rédaction D'un Protocole

d'Accord. Ministère de l'Environnement, des Eaux et Forêts de la République de Madagascar.

West, Paige
2006 Conservation Is Our Government Now: The Politics of Ecology in Papua New Guinea. Durham: Duke University Press.

Weszkalnys, Gisa
2013 Oil's Magic: Materiality and Contestation. *In* Cultures of Energy Power, Practices, Technologies. Sarah Strauss, Stephanie Rupp, and Thomas F Love, eds. Walnut Creek, CA: Left Coast Press.
2014 Anticipating Oil: The Temporal Politics of a Disaster yet to Come. The Sociological Review 62: 211–235.

Wilk, Richard
2007 It's about Time: A Commentary on Guyer. American Ethnologist 34(3): 440–443.

World Bank
2014 State and Trends of Carbon Pricing. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/06/01/090224b0828bcd9e/1_0/Rendered/PDF/State0and0trends0of0carbon0pricing02014.pdf.

Yager, Thomas R.
2014 The Mineral Industry of Madagascar. 2012 Minerals Yearbook, United States Geological Society. http://minerals.usgs.gov/minerals/pubs/country/2012/myb3-2012-ma.pdf, accessed February 19, 2015.

Zaloom, Caitlin
2006 Out of the Pits: Traders and Technology from Chicago to London. Chicago: University of Chicago Press.

Zelizer, Viviana A. Rotman
1994 The Social Meaning of Money. New York: BasicBooks.